



THE DEVELOPMENT OF MARKETING PLAN FOR A VIRTUAL CYCLING APPLICATION:  
THE CASE STUDY OF CHINA



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THE DEVELOPMENT OF MARKETING PLAN FOR A VIRTUAL CYCLING APPLICATION:  
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BY  
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Due to the COVID-19 pandemic, social activities have been greatly affected, so online activities have developed rapidly, and online work has gradually become the norm. In terms of cycling, the China Cycling Association canceled or postponed several races, affecting cyclists across the country. This is because mass gatherings and the high crowd density associated with such events increase the risk of virus transmission. Because of this, bicycle virtual riding software has developed rapidly, and users have increased rapidly. In addition, the gradual maturity of the metaverse concept has led more companies to invest in the development of bicycle virtual riding software. This study will explore and analyze the operation plan of bicycle virtual riding software in Beijing, China and to analyze the specific needs of Chinese people.

Keyword : Virtual cycling, Metaverse, COVID-19

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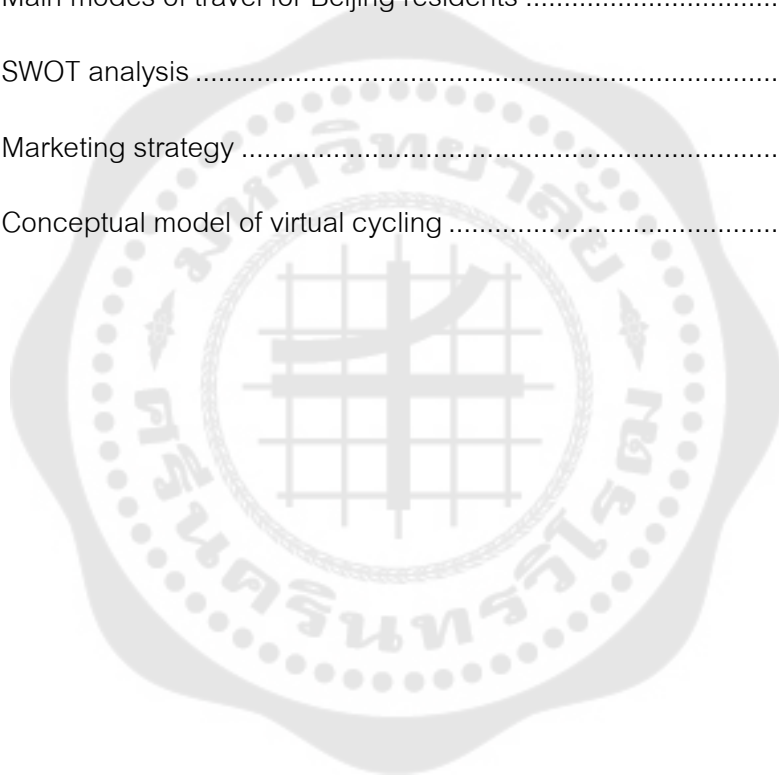
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# CHAPTER 1

## INTRODUCTION

### 1.1 Research Topic

The Development of Marketing Plan for a Virtual Cycling Application: The Case of Beijing China

### 1.2 Research background

Due to the COVID-19 pandemic, people's social activities have been greatly affected, so online activities have developed rapidly, and online work has gradually become the norm. In cycling, the China Cycling Association canceled or postponed several races, affecting cyclists across the country. In addition, the hospitality industry has also been affected, with cancellations of events, closure of hotels and accommodation, leisure parks, restaurants, and services. Like tourism, parks, gyms, and swimming pools are closed for many leisure activities. Around the world, sporting events are suspended or without fans in attendance. A prime example is the 2020 Olympic Games in Tokyo, which were postponed to 2021 due to the COVID-19 pandemic. There are indications that global events may be further postponed given the recent surge and increase in infections. This is because the mass gatherings and high crowd density associated with such events increase the risk of virus transmission. Because of this, bicycle virtual riding software has developed rapidly, and users have increased rapidly. In addition, the gradual maturity of the metaverse concept has led more and more companies to invest in the development of bicycle virtual riding software.

According to the survey, there are currently 10 foreign companies that provide virtual bicycle riding services. Zwift is one of those companies. Zwift is currently doing just that, offering many online multiplayer races. For example, people can participate in online bicycle races where people from all over the world can race on the same track. However, these companies have not yet entered the Chinese market, and there is no mature virtual cycling software for bicycles in China. Therefore, this study will explore

and analyze the operation plan of bicycle virtual riding software in China (Beijing), analyze the specific needs of Chinese people.

### **1.3 Research objectives**

Analyze the marketing strategies, advantages, and disadvantages of mainstream bicycle virtual riding software

Obtain the demand analysis of the population that can be used for domestic marketing

Establish marketing strategies for virtual cycling software in line with domestic commercial demand analysis

### **1.4 Scope of the study**

The study will involve members of cycling clubs and enthusiasts in Beijing area and sports and fitness enthusiasts on social media.

### **1.5 Benefits of the study**

Improve the social application experience of sports and fitness crowd

Conducive to the development of fitness

Provide a demand analysis model for cyclists

Get a virtual cycling software marketing plan

### **1.6 Terminology**

**Bicycle virtual riding software:** Bicycle virtual riding software is a software that allows users in different areas to ride together through the Internet and allows cyclists to ride at home.

The riding data is collected through the hardware of the riding platform and fed back to the virtual world.

**Zwift:** Zwift is an online, interactive training and racing platform. User's pedaling on a trainer drives user's avatar around a virtual course. The harder user pedal, the faster user's avatar goes.

User can ride with thousands of other riders inside Zwift. User can join group rides and races – and even get a draft from other riders – or just join the world and jump on with other riders when user want to. User can also do structured power-based workouts.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Virtual cycling?

Traditional cycling indoor training usually involves repeated pedaling on a fixed cycling platform, and people get bored during long repetitions. However, scientists have found that monotonous activities are easier and more motivating for users if they involve game elements. In technical terms, it's called "gamification." Boring indoor training can be turned into a game thanks to new technologies such as power meters or smart indoor trainers.

The essence of virtual riding is to transfer the user's performance on the bicycle into the virtual world. At the same time, different functions are added to the virtual world to meet the different needs of users, such as different scenes and customized avatars. A virtual ride can provide a different riding experience than the real world.

##### 2.1.1 How Virtual Cycling work

Users can access preplanned routes or workouts using virtual cycling apps. In order to be able to ride in the digital world, the watts per kilogram of the user are calculated. Each workout is programmed with either a gradient or a target wattage for each meter. This application is capable of calculating the speed of a rider based on the terrain on which the rider is traveling. As an example, a user of 80kg and 180 watts pedaling on a flat surface will reach a speed of 30 kilometers per hour if the user weighs 80kg.

Considering a gradient of 8% and consistent performance, the user's virtual speed is 8.5 km/h. As it would be outside in the real world.

##### 2.1.2 Virtually World and Augmented Reality

Zwift, a virtual cycling application, has digitized renowned cycling locales such as New York, London, and the World Championships route in Innsbruck. In the comfort of one's own residence, individuals have the ability to engage in virtual experiences such as traversing Central Park, exploring the city center of London, or partaking in competitive endeavors on roadways previously utilized by professional

athletes. Furthermore, users have the opportunity to locate Alpine passes situated adjacent to roadways within the jungle or an underwater glass tunnel within the digital realm of Watopia on the Zwift platform.

Rouvy, an alternative application, has a distinct methodology. The user's avatar is situated within an authentic physical setting, with a distinct emphasis on the actuality of the surroundings. The Tour de France, along with numerous other courses, may be accessed in video format, allowing users to engage in these hills at their preferred speed. The phenomenon under consideration is commonly referred to as "Augmented Reality," which entails the integration of digital components into the physical environment.

In both Zwift and Rouvy, the resistance of the user's smart trainer adjusts automatically in response to the prevailing gradient. Furthermore, it is important to note that users do not navigate the road in isolation. Virtual Cycling enables individuals from many geographical locations to access and participate in cycling activities through online platforms. Users have the opportunity to convene with their acquaintances for a virtual expedition and collectively partake in the experience. If the user's primary interest in cycling is in competitive aspects, it is worth noting that there are frequent digital races available for participation on a daily basis.

### **2.1.3 Smart Trainer**

The engagement and enjoyment of Virtual Cycling are contingent upon the utilization of an intelligent trainer. The integration of the smart trainer and the user's virtual cycling application facilitates the automatic modification of pedaling resistance for the user. This implies that while individuals are ascending an incline, they will need to exert more force on the pedals in order to maintain their velocity. Smart trainers are equipped with integrated power meters that assess the user's performance and then adapt the resistance levels.

### **2.1.4 Smart Trainer and Power meter**

If user have a power meter on user's bike in addition to user's smart trainer, user will not only increase accuracy. A power2max NG or NGeco will also automatically



transmit user's cadence. Additionally, a power meter in Virtual Cycling enables user to use the same cycling power data on outside on the road. (NEEF, FEBRUARY 24, 2022)

## 2.2 Advantages and disadvantages of virtual cycling

### 2.2.1 Advantages

#### Realistic Simulation of Many Different Racing Situations and Conditions

Continuous development of new routes and training environments is underway, with recent advancements incorporating simulated representations of many stages of the renowned Tour de France, notably featuring the highly acclaimed sprint finale along the iconic Champs-Élysées. At present, there exists a wide array of over 70 racing courses, including various distances, with some being short sprints measuring less than 5 kilometers, while others are classified as endurance courses, exceeding a length of 100 kilometers. Virtual reality technology allows for the realistic simulation of renowned climbing routes, including iconic ascents such as the Alpe d'Huez and Mont Ventoux. The flexibility of this activity enables a higher degree of training specificity compared to conventional indoor cycling methods.

In addition, virtual cycling platforms have the capability to replicate drafting effects, which replicate the energy-saving phenomenon of riding behind another cyclist in an outside setting. The drafting effect facilitates fundamental adjustments including variations in the cyclist's height and mass, the weight and model of the bicycle, and wheel selection (in the context of the Zwift simulation), the size of the riding group, and inclines, including even mild ascents of up to 3 degrees. During downhill cycling, riders have the ability to sustain speed while assuming various positions, with the most notable being the "super-tuck" position. This stance is highly aerodynamic and is adopted by all cyclists when free-wheeling at or over a specific speed threshold. Freewheeling is a frequently seen phenomenon during real-world riding on diverse terrains. Consequently, virtual training platforms have the capability to replicate a wide spectrum of cadences. Furthermore, virtual cycling platforms have the capability to simulate many types of road conditions, such as tarmac, gravel, and mud, each possessing distinct levels of resistance and providing unique riding encounters.

Therefore, by possessing only a single type of bicycle, the athlete is able to engage in a wider range of training and competition scenarios or categories that would otherwise be unattainable.

The latest advancement entails the implementation of a steering platform affixed to the bicycle at one's residence, enabling a heightened degree of engagement inside the virtual setting.

### **Safety**

Internationally, there is considerable variation in the incidence of cycling injuries caused by traffic, ranging from 174 to 1,329 per 100,000 registered cyclists (Ag, 2019). These injuries impose substantial financial burdens, with minor injuries resulting in an average cost of 841 € due to factors such as lost work time, medical expenses, and equipment replacement (Aertsens et al., 2010). Moreover, the presence of many factors such as heavy traffic, darkness, adverse weather conditions, the potential threat of encountering strangers, and the risk of bicycle theft frequently act as deterrents to individuals' participation in cycling (Heesch et al., 2012).

The application of simulated races in various fields, along with participation in large group races without the fear of accidents, offers significant benefits for individuals undergoing injury rehabilitation or suffering anxiety while riding in groups. Individuals with little confidence and competence in cycling might engage in race participation through virtual cycling platforms, therefore circumventing the potentially intimidating features associated with visiting an outdoor event and navigating the initiation of a large-scale race.

Athletes have the ability to engage in high-intensity training sessions without the hindrance of traffic or interruptions such as traffic lights, so enabling them to maintain standardized training loads. Indeed, the experience of pressure and urgency that can be generated in relation to virtual cycling has the potential to enhance both the intensity and enjoyment of high-intensity interval cycling among those who lack training (Farrow et al., 2019).

Another benefit is that cyclists are not required to be concerned about adverse environmental conditions, such as severe temperatures, precipitation, strong winds, or air pollution (Heesch et al., 2012). During indoor training sessions, cyclists have the ability to manipulate environmental conditions such as temperature and humidity. Additionally, they can employ hypoxia-inducing techniques to replicate various elevations. Gamification

The utilization of feedback loops frequently found in video games has resulted in a wide range of interactive applications that promote participation in the indoor riding experience, a phenomenon known as the gamification of indoor cycling (Beatty, 2013). The virtual training platform offers incentives for excellent performance in the form of special currency, experience points, and levels. These rewards can be utilized to make in-game purchases, such as bike frames and wheelsets, which possess certain features that can enhance performance, such as improved aerodynamics or reduced weight. Numerous studies (Van Der Kooij et al., 2019; Van Mastrigt et al., 2020) have demonstrated that rewards have the potential to serve as a motivating factor for individuals engaging in exercise tasks. These prizes can incentivize users to increase their exercise intensity, elevate their climbing distance, or prolong their activity duration, hence enabling them to earn more substantial rewards.

Furthermore, virtual cycling platforms intermittently present brief events known as power-ups at various locations around the course. These power-ups have the potential to enhance performance by providing advantages such as reduced drag or decreased cyclist body mass. This feature has resemblance to similar elements found in numerous video games. According to Farrow et al. (2019), the utilization of this approach has the potential to decrease the subjective perception of effort, leading to increased duration and/or intensity of cycling. Additionally, it has the ability to enhance the adaptability and enjoyment of the experience.

Moreover, the gaming nature of this program may attract new participants by including music and social interactions (e.g., multiplayer options that allow friends to be included or guidance to be received from experienced players), as

well as reducing frustration due to poor-quality graphics and overly complex controls and display functions that may evoke motion sickness. (Faric et al., 2019)

Finally, virtual forms of training may allow players to engage in more physical activity thereby reducing screen time and self-efficacy (Staiano et al., 2017).

### **2.2.2 Disadvantages**

#### **Indoor vs. Outdoor Load Metrics**

Throughout a given season, a considerable number of cyclists, whether they engage in recreational or competitive cycling, do training sessions in both indoor and outdoor environments. The perception of cyclists towards these two methods of training may vary depending on the technology employed. According to Mieras et al. (2014), there may be variations in power output and heart rate between outdoor and indoor cycling. Hence, it is not appropriate to interchangeably use internal and exterior load measures in relation to indoor and outdoor riding.

#### **System Failure**

One additional limitation of the Zwift system pertains to dropouts, which refer to instances of temporary or prolonged disruption in Bluetooth or Ant+ connectivity between power meters, trainers, or computing equipment utilized for simulation purposes. These events are commonly referred to as "cyber mechanicals" within the racing community, drawing a parallel to the mechanical failures observed in traditional, non-virtual bicycle races. Instances of dropouts are infrequent, sometimes of short duration, yet their occurrence at any given moment can significantly affect observable performance, particularly in the context of a race. Various factors can contribute to dropouts, including hardware malfunctions, software issues such as bugs or hosting problems, and human errors such as neglecting to charge devices. Irrespective of the underlying factors, the occurrence of dropouts presents a potential risk that sponsors and/or athletes may perceive as unfavorable.

#### **The Human Component**

The inherent characteristics of the simulation may diminish the requisite proficiency in technical skills and bicycle control that are necessary for achieving success in competitive non-virtual events at an elite level. The manner in which maximal

sprinting is executed on an ergometer differs from outside sprinting due to its unique construction. The platform effectively replicates the process of cornering, hence eliminating the necessity for the user to engage in this activity. Moreover, comprehending body location during descent or braking, as well as effectively managing distances among a collective of cyclists, is not seen required. The presence of onscreen avatars and power statistics introduces a level of complexity that hinders the ability to accurately predict the outcomes of attacks or alterations in tempo. The absence of crowds eliminates the potential for emotional support and the feeling of gratification that they can bring in moments of accomplishment. This may potentially diminish the level of enthusiasm among both the competitors and sponsors. In addition, it is worth noting that the collective performance of professional cyclists can be influenced by the abilities and attributes of their fellow teammates. For instance, it is common for cyclists to prioritize supporting the team leader's victory, even if it means sacrificing their own prospects (Torgler, 2007). In general, virtual racing may attenuate the intuitive feelings of real-life racing. (McIlroy, Passfield, Holmberg, & Sperlich, 2021)

## **2.3 Virtual cycling help improve training**

### **2.3.1 How does Zwift calculate rider speed?**

The velocity at which the user rides within Zwift's virtual environment is influenced by a multitude of parameters.

Watts is the primary determinant of a user's speed. The speed at which the user travels is directly proportional to the amount of power exerted by the user on the pedals.

The speed of a user's avatar in Zwift's virtual environments is influenced by various factors, including road gradient, draft effects, road surfaces, and air density values.

In the context of cycling, it has been observed that cyclists with lower body weight tend to achieve higher speeds on both flat terrain and uphill gradients when compared to riders with higher body weight, assuming that both individuals are exerting an equivalent amount of power measured in watts. Riders with greater body weight will

experience a higher rate of descent. Similar to the experience of being in nature. Please refer to the article under "The Impact of Rider Weight on Speed" for detailed information on this topic.

In the context of cycling, it is observed that taller cyclists tend to have less aerodynamic efficiency compared to their shorter counterparts. Consequently, when two riders exert the same wattage and all other factors such as weight, frame, and wheels remain constant, the shorter rider is likely to achieve a higher speed. Please refer to the article on "The Impact of Rider Height on Speed" for detailed information.

Virtual Bike Choice: the frame and wheelset user choose affects user's speed, as each frame and wheelset have a weight and aero (CdA) value assigned to it. See our frame and wheel charts for a detailed breakdown of the performance of each frame and wheelset on Zwift. (SCHLANGE, NOVEMBER 4, 2020)

### **2.3.2 Virtual-reality exergaming improves performance during high-intensity interval training**

The main results of this study indicate that: (i) engaging in a single session of high-intensity interval training (HIIT) is more pleasurable when conducted using a virtual reality exergaming platform as opposed to traditional ergometry; (ii) when individuals are able to visually perceive and compete against their own prior performance, they engage in HIIT at a greater intensity. Additionally, by augmenting the resistance of the mechanical ergometer, exercise intensity can be further enhanced without negatively impacting the enjoyment of the exercise session. According to several cycling exergaming studies, the current study found that participants reported higher levels of enjoyment in the basic exergaming condition (track) compared to the control condition (blank). This suggests that the incorporation of a virtual reality (VR) exergaming platform can enhance the enjoyment of a high-intensity interval training (HIIT) session (Monedero et al., 2015; Rhodes et al., 2009; Warburton et al., 2007). The observed simultaneous rise in subjective vitality between blank and track modes indicates that VR-exergaming evoked sensations of enthusiasm and vigor, suggesting the cultivation of intrinsic motivation (Ryan & Frederick, 1997). The observed variations between the blank and track modes did not result in any significant alterations in

exercise intentions. This lack of effect may be related to the novelty of the virtual reality (VR) equipment, as participants may not have fully embraced the idea of having continued access to the equipment in the future. In comparison to a comparable experimental design, no significant distinctions were observed in the metrics of exercise intensity, including %HRMAX, power output, and energy expenditure, when comparing blank and track modes (Glen et al., 2017). This observation could indicate the degree of immersion in our fundamental VR-exergaming mode, which was not effective in diverting users' attention from the physical exercise (Glen et al., 2017). Alternatively, it could be attributed to the instructions provided to participants before engaging in both the blank and track modes. Nevertheless, considering that the enjoyment of acute exercise has been identified as a predictor of future adherence, this discovery emphasizes the potential of virtual reality exergaming as a means of promoting high-intensity interval training (HIIT) among the broader community (Lewis, 2016). Additional investigation is necessary to ascertain whether virtual reality exergaming interventions are able to maintain levels of enjoyment and exercise intentions over an extended period. The utilization of virtual reality exergaming has been found to enhance the level of satisfaction experienced during a single session of high-intensity interval training (HIIT). This suggests that VR-exergaming could potentially serve as an effective means of engaging the general population with HIIT as a style of exercise training. The utilization of visual aids to enable individuals to see their past performance has the potential to enhance the exercise stress associated with High-Intensity Interval Training (HIIT). Additionally, this phenomenon seems to serve as a motivator for individuals to surpass heightened levels of mechanical resistance and exert greater effort, while not detrimentally impacting their level of enjoyment. According to the study conducted by Faric et al. (2019).

## **2.4 Social media**

The Internet provides sufficient communication channels for communities, such as Weibo, WeChat, forums, QQ space, etc. The choice of social channels should not only be “big and comprehensive” but also “small but beautiful”. In other words, the

community must fully establish a wide range of communication channels, understand the characteristics of various channels, and be able to fully and rationally utilize them.”

Weibo new users, forum accumulation, and WeChat customer service are the application systems of Xiaomi mobile phones for Internet channels. Through Weibo, Xiaomi mobile phones and their peripheral products are widely disseminated to attract the attention of potential users; Xiaomi's forum gathers a group of loyal fans to guide topic discussions and content creation; WeChat functions as a platform for Xiaomi mobile phones. After-sales service. It can be seen from this that Xiaomi mobile phones have a clear division of labor for each social channel, which has become a template for each community to select and position social channels. Luoji Siwei chose the same path as Feiben when setting up community channels: using forums to target the main community members and using WeChat to interact directly with community members. (Yang & Lisi, 2015)

## **2.5 Online marketing methods**

### **2.5.1 Search Engine Marketing**

Contemporary people mainly use the Internet to obtain information, and they mainly use search engines to find interesting information on the Internet. More and more people will purchase products after learning more about product information through the Internet. Therefore, if users can learn about product information through search engines, the conversion rate of users can be improved.

According to statistics, the number of search engine users in China reached 203 million in 2008, and the utilization rate of search engines reached 68%. Nearly half of the enterprises (48.5%) started to use search engines for marketing.

According to the user's search purpose, the behaviors of people using search engines are divided into three categories: navigation type, information acquisition type and transaction type. The purpose of a navigational search is to enter a website. The purpose of the information acquisition type is to find the corresponding information on the Internet. The purpose of transactional search is to conduct online



transactional activities. The former has the highest proportion of searches, accounting for about 80%, and the latter two account for about 10% each.

#### Web Click Behavior Research

Relevant studies have pointed out that most of the click behaviors of users occur on the homepage, and people will click on the top-ranked search results. Another interview showed that respondents generally believed that the information in the organic search results column (the content on the left side of the screen) was credible, while they were less interested in the information in the sponsored links column (the advertising column on the right and top).

#### 2.5.2 Implantable advertising marketing

Product placement mainly refers to advertisements played in audio-visual videos such as movies and TV. Different from previous TV advertisements, modern advertisements are more focused on the accuracy of delivery, and accurately place different product placement advertisements according to different user groups. Judging from the current research, there are mainly five aspects that affect the effect of product placement as shown in the figure below: content factors such as movies and TV programs, products or brands, audiences, environmental factors, and the process of product or brand placement.

According to the "China TV Variety Entertainment Program Market Report 2006-2007" report by CCTV-Sofrui Media Research Company, in 2005 alone, the output value of product placement in China's variety entertainment programs reached nearly 1 billion yuan.

#### 2.5.3 Other service platform marketing

Other service platform marketing refers to mobile social applications, such as WeChat, Weibo, QQ, Instagram, etc. Push advertising messages among more subdivided groups of people to achieve efficient marketing effects.

In the marketing method using WeChat, QR code is one of the important communication channels. O2O (online to offline) marketing can be easily realized through the QR code, and offline marketing can be driven through online marketing.

Its working principle is first placing the QR code pattern in the viewfinder frame, and then scan and identify another user's QR code identity to make them friends, and complete O2O business activities in this way.

## 2.6 Marketing strategy

### Product marketing strategy

According to the analysis of the main marketing methods, it is difficult to promote foreign products directly in China. The reason is that the consumption habits of user groups are different, the support of third-party platforms is not in place, and users are more willing to choose products that can find relevant information. Therefore, the promotion plan should be designed from the above three aspects.

### Service marketing strategy

There are obvious differences between service marketing and product marketing, which is formed based on the intangible, heterogeneity, inseparability, and non-storage characteristics of service itself. Excellent service marketing should form users' perception in service quality, concept, responsibility attitude and so on.

Virtual reality technology requires not only strong technical support, but also high-quality customer service. Therefore, it is necessary to strengthen internal management, improve service quality, provide service quality commitment to customers, and formulate high standard service rules.

### User stories

Adherence to the INVEST principle is crucial in the process of generating a user narrative of superior quality.

To enhance the independence of a user narrative, it is imperative to minimize its dependencies on other user stories. The interdependencies of user stories provide challenges in terms of planning, prioritization, and effort estimation. Frequently, the reduction of dependencies can be achieved by the consolidation of user stories and their subsequent decomposition.

If the negotiability of the content of a user narrative is present, it can be inferred that a user story does not possess the characteristics of a contractual

agreement. A user story card is a concise depiction of a user story that deliberately omits excessive elaboration. The communication phase yields specific details. The level of detail in a user narrative cartridge is excessive and hampers effective communication with the user.

Significant - It is imperative that every narrative possesses inherent value for the customer, whether they are the user or the purchaser. One effective strategy for enhancing the value of user stories is to solicit input from consumers in their composition. Upon recognizing that a user story is not a binding agreement and is open to negotiation, customers will be inclined to willingly compose the tale.

The development team is required to perform an estimation of a user story in order to determine its priority, allocate resources, and establish a timeline for implementation. The challenges that impede developers' ability to estimate tales stem from two primary factors: insufficient domain knowledge, necessitating enhanced communication, or excessively large stories, requiring subdivision into smaller components.

In order to optimize efficiency and ensure completion, it is advisable for a well-crafted narrative to be concise, ideally encompassing no more than ten ideal individuals' worth of work every day, particularly within a single iteration or Sprint.

The larger the user story, the higher the potential risk associated with scheduling, effort estimation, and related factors.

The testability of a user story lies in its ability to be verified through testing, hence confirming its feasibility. If a user narrative lacks testability, the user is unable to ascertain its readiness. An illustration of an unverifiable user narrative: The software ought to provide a high degree of user-friendliness.

## **2.7 Marketing solutions**

Invite cyclists to experience and publish videos before the app is launched to attract new users.

Create hot spots on major social media, such as holding offline virtual bicycle riding experience activities.

Enter the live broadcast platform and invite cyclists to experience virtual bicycle riding.

Advertisement placement in bicycle races.

Promote products according to the ranking of social media platforms most used by Chinese people.



## CHAPTER 3

### RESEARCH METHODOLOGY

This chapter mainly analyzes the advantages and disadvantages of virtual riding software and the current market situation. Based on the research questions, the marketing plan of virtual riding software in Beijing, China is analyzed. Mainly used research methods such as SWOT analysis, user stories, and questionnaires.

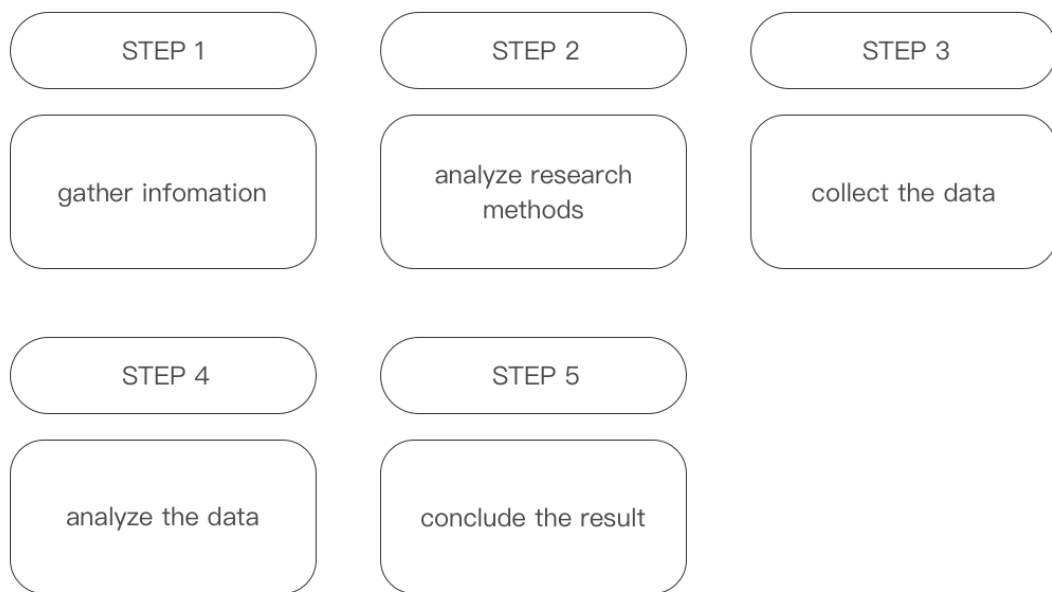


Figure 1 research process

Source: by author

#### 3.1 Research design

##### 1. Analysis of global virtual cycling software market.

Analyze the development situation of the global virtual cycling market.

Analyze the main types of global virtual cycling software and their market share.

##### 2. Comparative analysis of advantages and disadvantages of major virtual cycling software.

Analysis of the global promotion and application. Country, region, and population analysis

Promotion in Beijing. Analyze the main reasons for the slow rollout. Analysis on the status quo of virtual cycling market in Beijing, major virtual cycling software and their market shares.

The demand structure of Chinese consumers or consumer groups at different levels for virtual bicycles; the demand for virtual cycling product functions.

4. According to the survey and analysis results, the marketing plan of bicycle virtual riding software should be designed to meet the different needs of Chinese people and highlight the characteristics of the software.

### 3.2 Research Methods

#### 3.2.1 User stories

Select survey group. Establish user stories through interviews with Beijing Bicycle Club members and cycling enthusiasts.

Create tasks questions. Questions that will be asked during the interview include riding habits, purpose of riding, who you ride with, riding time and distance, why you insist on riding, what you get from riding, etc.

Build user stories. By building user stories to understand what I really need and reduce potential risks

#### 3.2.2 SWOT analysis

The acronym SWOT represents the four key elements: Strengths, Weaknesses, Opportunities, and Threats. These components serve as a framework for conducting an analysis that encompasses the examination of strengths, weaknesses, opportunities, and threats.

The SWOT analysis is a systematic approach employed to assess the competitive strengths, weaknesses, opportunities, and threats faced by an organization. Its purpose is to effectively align the company's strategy with both its internal resources and the external environment. The purpose of conducting a situation analysis is to assess the internal and external competitive environment, as well as the competitive

conditions. This involves identifying the primary internal strengths and weaknesses, as well as external opportunities and threats that are closely associated with the research subject. Through thorough investigation, these factors are organized in a matrix format. Subsequently, a system analysis approach is employed to examine the interplay between these factors and draw a series of relevant conclusions. The conclusion typically entails the process of decision making.

This paper aims to conduct a comprehensive study of both internal and external elements that have the potential to impact the company plan, utilizing the SWOT analysis framework.

### **3.3 Population research**

The research will be conducted among cycling clubs and cycling enthusiasts in Beijing. Through qualitative analysis, we collected the cycling habits, consumption concepts and values of different groups of people.

Cycling Habit: Ride every day; I will participate in outdoor cycling activities on the weekends. I only ride freely when I am busy at work; I am used to riding with friends; I like to explore different routes on my own

### **3.4 Sample size**

The study will be carried out among bicycle clubs in Beijing, and 200 people will be sampled to collect data through questionnaires and other methods.

Beijing has a good cycling environment, so there are many cycling clubs. Surveying cycling enthusiasts in Beijing can yield diverse results.

### **3.5 Research progress**

#### **3.5.1 User stories**

Three elements of a user story

User stories are used as a form of expression to describe requirements in software development. To standardize the expression of user stories and facilitate communication, user stories are usually expressed in the format of: As a user character, I want to complete activities to achieve value.

**A complete user story consists of three elements:**

Role (who): Who is going to use this

Activity (what): What is to be accomplished

Value (value): Why is it done and what value does it bring INVEST

A user story is a short description of a feature from the end user's perspective: As (user type), I want (some goals, features) to (some reasons).

**An example:**

As a real estate agent, I would like to have a tenant ID photo so that I can attach it to the rental contract.

**When writing a user story, it needs the following key things:**

This section provides a comprehensive overview of the functions that fulfill service needs. Acceptance Criteria: The set of criteria that can be used to determine the completion status of a user story. One of the most crucial aspects to consider is that it must be: Introduce yourself to the INVEST principle.

Adherence to the INVEST principle is crucial in the process of generating a user narrative of superior quality.

There are three criteria.

When adhering to the INVEST principle, a user story might be considered a well-constructed user story. In addition, I will prioritize three criteria that aim to assist users in effectively adhering to them when generating user stories. There are three conditions that need to be met: the presence of a single user, the provision of total value, and the absence of any reliance.

An individual

Limit the inclusion of users to a single individual, as several users tend to exhibit subtle variations. Typically, consumers of a general nature tend to exhibit a shared set of wants.

The concept of complete value refers to the absolute value of a real number, which is the distance of that number from zero on the



Provide a comprehensive customer value proposition. The attainment of a comprehensive user story implies that upon its fulfillment, the user is able to successfully accomplish a distinct and purposeful objective.

Irrespective of

There exist three prevalent forms of dependency, namely overlapping, sequential, and confined.



## CHAPTER 4

### RESULT

#### 4.1 Information gathering

##### 1. the development situation of the global virtual cycling market.

The virtual bike market has grown significantly in recent years and is expected to continue to expand in the coming years. With gyms and fitness centers closing, the COVID-19 pandemic has accelerated the adoption of virtual cycling, making it a popular alternative to indoor exercise.

The market is highly competitive, with many companies offering virtual cycling solutions, such as Peloton, Zwift, and Wahoo. Zwift is one of the leaders in the virtual bike market, a company whose products and services provide an interactive cycling experience. Allows users to ride and participate in races and events in the virtual world.

Driven by the growing popularity of indoor cycling, growing health awareness, and the convenience of exercising at home, the virtual bike market is expected to continue to grow in the coming years. At the same time, virtual technology is also developing rapidly, such as AR, which is the integration of virtual reality and augmented reality and may also provide users with a more immersive and engaging experience.

However, the market also faces challenges, including concerns about the cost of virtual cycling equipment and services, the need for high-speed internet connections, and the potential for user fatigue and burnout. Therefore, companies will need to continue to innovate and deliver new and engaging experiences to maintain and increase their market share in the virtual cycling industry.

2. To analyze the major types and their market shares of Global Virtual Ride Software. According to a report by Research and Markets, the global virtual cycling market was valued at USD 677.3 million in 2020 and is expected to reach USD 1,164.5 million by 2028, growing at a CAGR of 6.9% from 2021 to 2028. The report also

suggests that the increasing popularity of indoor cycling, especially during the pandemic, has been a significant factor in the growth of the market.

#### 4.2 Data collection

##### 4.2.1 What are the main motivations for Chinese users to use social media?

This is the top ten main motivations for Chinese people to use the Internet in 2022, and the data has multiple choices.



### Top 10 main motivations for Chinese users to use social media

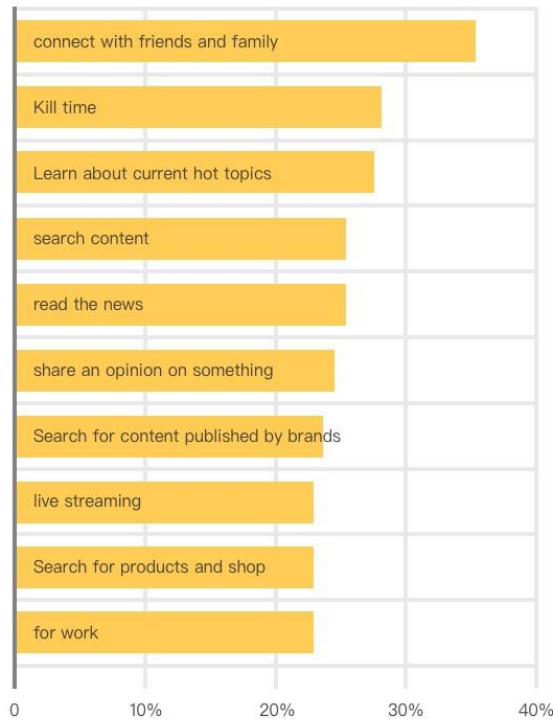


Figure 2 Main motivations to use social media

Source: zhihu.com

#### 4.2.2 Which social media platforms do Chinese users generally use?

This graph shows the top 10 social media platforms that Chinese people usually use in 2022, and the data has multiple choices.

### Top 10 social media platforms in China

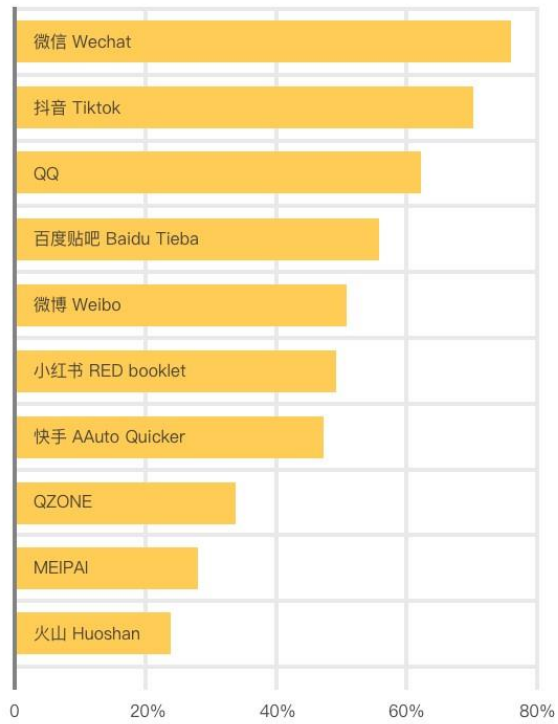


Figure 3 Social media platforms in China

Source: zhihu.com

#### 4.2.3 Main modes of travel for Beijing residents

This picture shows the proportion of one-day travel structure in the Beijing area in 2022. The data are 40.3% for non-motor vehicles, 27.5% for cars, 15.5% for buses, 13.2% for subways, and 3.4% for others.

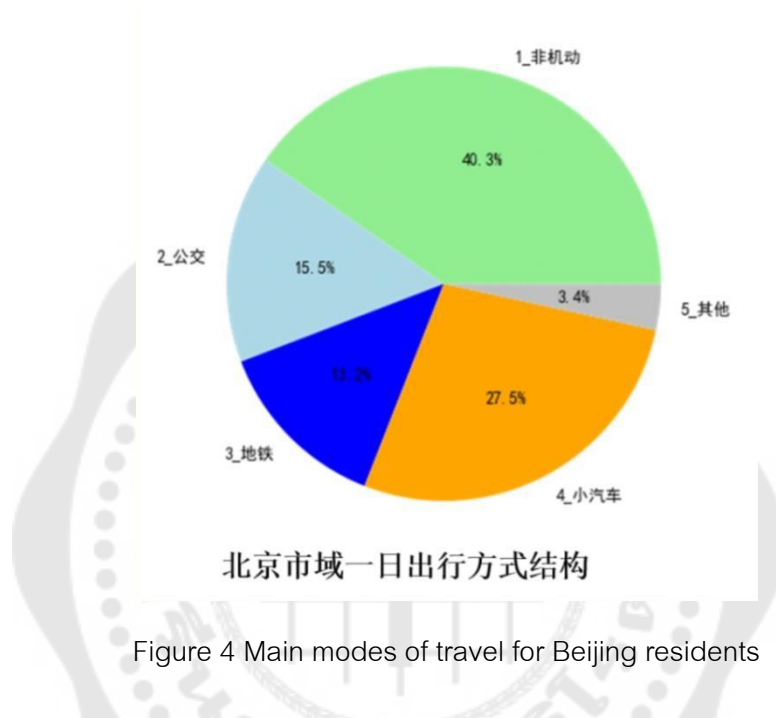


Figure 4 Main modes of travel for Beijing residents

Source: zhihu.com

#### 4.2.4 SWOT analysis of virtual cycling

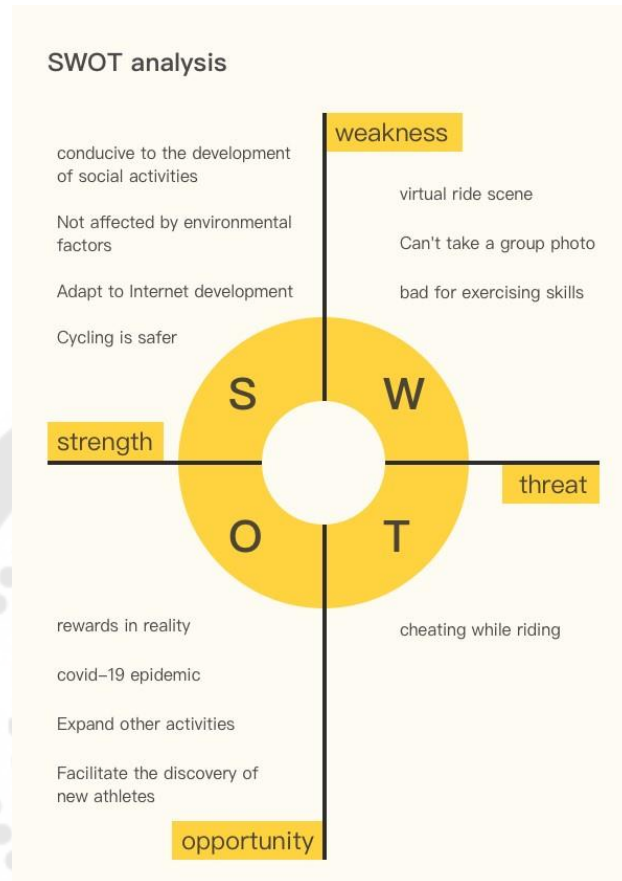


Figure 5 SWOT analysis

Source: by author

#### **Strength:**

It is conducive to the development of social activities

At present, outdoor cycling activities are mainly divided into regions, and it is difficult for cyclists in different regions to ride together. Virtual cycling allows cyclists in different areas to connect via the Internet and ride online. Communicating with each other through the virtual cycling platform is conducive to promoting cycling activities.

Not affected by environmental factors

Outdoor riding is usually affected by traffic, weather, temperature, air quality and other factors, and online virtual riding software can avoid these problems.

Adapt to the development of Internet

Thanks to the rapid development of the Internet, it provides good support for virtual reality technology. At present, China is promoting the construction of digital cities and applying virtual reality technology to some technical fields. As a kind of virtual reality technology, virtual bicycle riding software can be promoted quickly.

It's safer to ride a bike

Cycling is popular in China, and officials encourage people to use bicycles for travel or commuting, but the number of bicycle accidents and deaths has been rising every year, from 16,270 accidents and 187 deaths in 2016 to 22,308 accidents and 245 deaths in 2020, according to the Ministry of Transport.

According to statistics, the number of deaths and injuries within 30 days of traffic accidents involving bicycles (including pedal bicycles, electric bicycles, electric assisted bicycles) has risen for five consecutive years, with the number of bicycle deaths rising from 187 in 2016 to 245 in 2020, an increase of 31%; The number of injuries increased by about 34% from 14,908 in 2016 to 230,000 in 2020.

The above information comes from the statistics of China's Ministry of Communications, which shows that there are certain dangers in cycling. Due to the inconsistent level of road construction in different regions, it is more likely to lead to bicycle accidents. Online virtual bike riding can avoid bicycle accidents to some extent.

**Weakness:**

Virtual bicycle scene

The virtual reality riding scene has two sides, which can bring novel riding experience, but also make riders unable to feel the riding scenery in the real environment.



No group photo's

Because of the virtual reality technology, users can not get face to face experience, cannot take photos with friends. This problem can be avoided to some extent by customizing characters in virtual reality.

Not conducive to the practice of real riding skills

Because the virtual riding is not on the real road, it is not conducive to training the real riding skills. Virtual cycling can play a role in assisting physical exercise.

**Opportunity:**

The covid-19 epidemic

Because of the covid-19 epidemic, some people do not want to reach large crowds, so indoor virtual cycling can meet the needs of this group of people.

Expand other activities

In the long run, use virtual bike riding assets to precipitate

Promote the discovery that virtual cycling products can be quickly expanded to other sports.

Promote the discovery of new athletes

With the permission of the user, the virtual bicycle riding product can quickly collect the user's cycling data indicators, and the data analysis can quickly find the crowd suitable for the training of professional cyclists.

**Threat:**

Cheating on a bike

Because it is an online virtual bike ride, some users will use software loopholes to cheat, which is unfair to other riders.

#### 4.2.5 User stories

To understand the user's difficulties and potential needs, collect and organize different user stories.

**User story 1**

Name: Zheng Hongtu

Age: 30

Occupation: Designer executive

Personality: Cheerful, independent, responsible

Story: I often travel to different cities, and I like to explore new cities by bicycle. I think cycling can enjoy the scenery and feel the local culture. I usually join cycling clubs in different cities and participate in cycling activities, which not only give me a deep understanding of the history and culture of the city, but also can make friends.

Acceptance criteria: Experience different cultural landscapes, be able to join a cycling club, be able to make new friends.

**User story 2**

Name: Liang Yuanju

Age :20

Occupation: University student

Personality: Talkative, curious, and helpful

Story: I am a student in a university, and I often go to campus with my friends by bicycle, and we can communicate what happened recently on the way. We also participate in group rides organized by the campus cycling club, which not only helps us keep fit, but also creates a sense of camaraderie among classmates.

Acceptance criteria: Able to communicate with friends, able to join the school cycling club.

**User story 3**

Name: Xu Xiushan

Age :70

Occupation: Retired

Personality: Friendly, positive, loving life

Story: I am retired and to maintain my health, I join a cycling club organized by a local community center. Clubs provide opportunities to network with other seniors,

improve physical fitness and learn new skills. We often ride in a group, which not only brings a sense of accomplishment, but also makes new friends and enjoys the good time in the outdoors.

Acceptance criteria: Be able to join community clubs, be able to make new friends, and be able to satisfy the user's sense of accomplishment.

#### **User story 4**

Name: Zhu Yangyan

Age :27

Occupation: Cyclist

Personality: Friendly, self-disciplined, talkative

Story: As a member of the cycling club, I enjoy meeting other like-minded people and sharing news and products about cycling with them. We organize group rides on the weekends, which not only provide great exercise, but also a social activity where we can connect with others.

Acceptance criteria: Be able to make new friends, be able to participate in cycling activities, and be able to reach user's exercise goals.

#### **4.2.6 Data analysis on the questionnaire of virtual riding software**

Table 1 Questionnaire

What's user's gender?

options	quantity	percentage
Male	58	57.43%
Female	43	42.57%
Other	0	0
	All 101	

## What's user's job?

options	quantity	percentage
Arts	18	17.82%
Business	35	34.65%
Communications	8	7.92%
Education	9	8.91%
Health care	6	5.94%
Hospitality	2	1.98%
Information technology	2	1.98%
Law enforcement	0	0%
Sales and marketing	4	3.96%
Science	5	4.95%
Transportation	9	8.91%
Other	3	2.97%
	All 101	

## Do user ride to company/attraction/shop?

options	quantity	percentage
Yes	71	70.3%
No	30	29.7%
	All 101	

## How often do user ride to company/attraction/shop?

options	quantity	percentage
Less than 2 times a week	27	38.03%
Between 2 to 5 times a week	37	52.11%
More than 5 times a week	7	9.86%
	All 71	

How do user search for information?

options	quantity	percentage
Mobile phone apps	38	37.62%
Website search engine	56	55.45%
Ask people	45	44.55%
Video website	26	25.74%
Other (please specify)	0	
	All 101	

Does user pay attention to current hot news?

options	quantity	percentage
Yes	75	74,26%
No	26	25.74%
	All 101	

Does user watch live broadcast?

options	quantity	percentage
Yes	67	66.34%
No	34	33.66%
	All 101	

Do user watch bicycle races? (Live viewing, live broadcast, video, etc.)

options	quantity	percentage
Yes	71	70.3%
No	30	29.7%
	All 101	

How often do user watch bicycle races? (Live viewing, live broadcast, video, etc.)

options	quantity	percentage
Never	24	33.8%
Hardly	24	33.8%
Often	16	22.54%
Always	7	9.86%
	All 101	

Which of the following brands do user know?

options	quantity	percentage
Zwift	27	26.73%
Trainer Road	43	42.57%
Wahoo System	45	44.55%
Fulgaz	33	32.67%
Rouvy	27	26.73%
RGT cycling	26	25.74%
Other	0	0%
None	4	3.96%
	All 101	

Have user ever used virtual cycling software? (Such as: Wahoo Fitness, Zwift, kinomap, etc.)

options	quantity	percentage
Never	22	21.78%
Sometimes (1-3 times a week)	45	44.55%
Often (3-5 times a week)	28	27.72%
Almost every day (over 5 times a week)	6	5.94%
	All 101	

Does user think the virtual cycling software is easy to use? (Please rate)

options	percentage
58	73.42%
All 79	

What type of virtual riding environment do user prefer?

options	quantity	percentage
Close to reality (Cycling scenes will be closer to reality, even including real streets)	40	50.63%
full of imagination (The riding scene is mainly science fiction, which is a fictional world)	38	48.1%
don't care about the riding environment	1	1.27%
other	0	0%
	All 79	

What do user typically use virtual ride software for?

options	quantity	percentage
Realistic virtual worlds	26	32.91%
training programs	38	48.1%
social interaction/community features	34	43.04%
accurate power and cadence measurement	27	34.18%
freeride	10	12.66%
other	0	0
	All 79	

How likely are user to recommend it to a friend or family member? (Please rate)

options	percentage
62	78.48%
All 79	

How important do user think social features and social interaction are in virtual cycling software? (e.g.: community clubs, leaderboards)

options	percentage
54	68.35%
All 79	

Would user rather train with virtual ride software or freeride?

options	percentage
43	54.43%
All 79	



Have user ever raced with virtual ride software?

options	quantity	percentage
Yes	61	77.22%
No	18	22.78%
	All 79	

Would user pay for the professional functions on virtual cycling software? (Such as: game appearance, training analysis, Coaching, etc.)

options	quantity	percentage
Yes	34	Yes
No	27	No
Not really	18	Not really
	All 79	

Which device do user like to use to take a virtual ride?

options	quantity	percentage
Smartphone Apps	28	35.44%
Computer Software	50	63.29%
Smart TV	37	46.84%
Others	0	0
	All 79	

How would user rate the value for money? (The cost of virtual cycling)

options	percentage
45	56.96%
All 79	

Will user buy products from a store in the virtual cycling apps? (Such as: bike, bike equipment, cycling clothing, etc.)

options	quantity	percentage
Yes	52	65.82%
No	21	26.58%
Not sure	6	7.59%
	All 79	

What features do user wish virtual ride software could have or update?

options	quantity	percentage
Social functions	24	30.38%
professional competitions	47	59.49%
shopping functions	30	37.97%
clubs	31	39.24%
coaches	14	17.72%
other	0	0
	All 79	

What do user pay more attention to when purchasing a product?

options	quantity	percentage
Price	39	38.61%
Functionality	60	59.41%
Interaction	56	55.45%
other	0	0
	All 101	

Does anyone around user use virtual cycling software?

options	quantity	percentage
Friends	26	25.74%
Family	31	30.69%
Club members	28	27.72%
other	14	13.86%
none	2	1.98%
	All 101	

Do they recommend virtual cycling software to user?

options	quantity	percentage
Yes	55	54.46%
No	35	34.65%
Not really	11	10.89%
	All 101	

#### 4.3Result analyze

Through the ranking chart of the most important motivations for using social media in China, it can be found that connecting with friends and family is the most important motivation. Nearly 30% of people browse hot topics, and more than 20% watch live broadcasts. Therefore, by creating hot topics and live broadcasts, people can discover new products.

As far as cycling is concerned, the publicity method should be closer to the habits of cycling enthusiasts. Here are a few ways to advertise.

Invite cyclists to experience and publish videos before the app is launched to attract new users.

Create hot spots on major social media, such as holding offline virtual bicycle riding experience activities.

Enter the live broadcast platform and invite cyclists to experience virtual bicycle riding.

Advertisement placement in bicycle races.

Promote products according to the ranking of social media platforms most used by Chinese people.

Through SWOT analysis, the virtual bicycle riding application benefits from the rapid development of the Internet. Since activities can be performed at home, it not only reduces the risk of outdoor cycling injuries, but also is not affected by weather and environmental factors.

The new crown epidemic has led to the rapid development of Internet services, which is conducive to the development of virtual bicycle rides. Because the riding data will be saved and published, potential athletes can also be quickly discovered through the app.

When the number of users is sufficient, other sports modes should continue to be launched to cover a wider user group.

through social media. Especially with the unique creativities that make social media especially Instagram the most widely used for medium to small businesses. With the ease of technology now becoming instant by shopping online buyers can order and interact anywhere, make transactions by transfer and goods arrive at home.(Soegoto & Utomo, 2019)

At the same time, the virtual bicycle riding application also has some disadvantages, such as cheating and not being able to take pictures. Therefore, the development of the anti-cheating system should be strengthened, and functions such as custom appearance should be developed to increase the user's sense of substitution.

According to the statistical chart of the main travel modes of Beijing residents, nonmotor vehicles are the most important travel mode, and the number of people interested in cycling is larger. Therefore, the promotion of virtual bicycle riding applications can achieve better results.

#### 4.4 Marketing Strategy

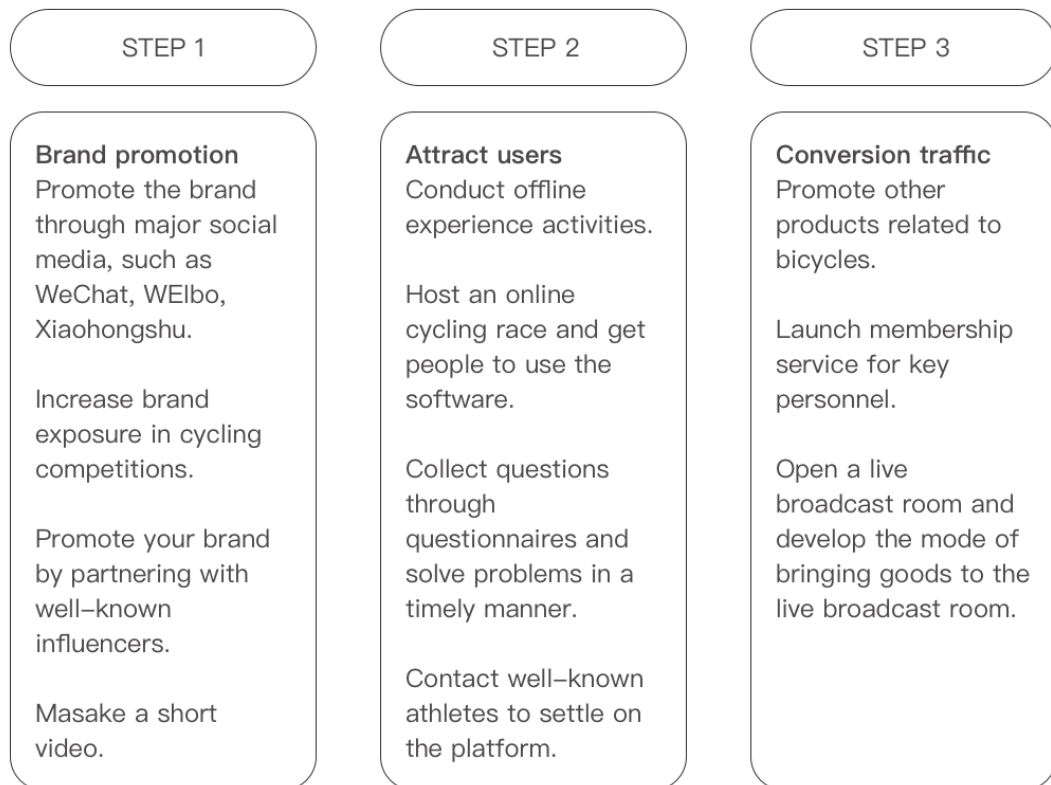


Figure 6 Marketing strategy

Source: by author

#### Brand Promotion:

The larger the initial seed customer size a company has, the greater the competitive advantage it gains, all else being equal. (Hou, 2017)

Promote the brand through major social media, such as WeChat, Weibo, Xiaohongshu Promote the brand in trending apps.

Accurately targeted advertising technology is increasingly important because of the intrusiveness of ads and the advertising value determines the user's attitude towards the advertising.(Zhiyang, 2017)

Increase brand exposure in cycling competitions

The advertisement in the competition is a way for target customers to quickly learn about products that meet their needs. Promotion in bike races can get more cyclists aware of virtual rides.

Promote the brand by partnering with well-known influencers Make a short video.

#### **Attract users:**

Conduct offline experience activities

Holding offline events, such as in shopping malls, can achieve the purpose of attracting attention and increasing popularity.

Host an online cycling competition and invite cycling enthusiasts to experience the software

This mainly promotes the application through the people who participated in the test and can collect professional opinions.

Collect questions through questionnaires and solve problems in a timely manner Contact well-known athletes to settle on the platform Promote products through famous people to drive fans.

#### **Conversion traffic:**

Promote other products related to bicycles

By promoting other products, achieve the purpose of drainage, to make a profit. Launch membership service for key personnel

Launch membership service to profit from core users.

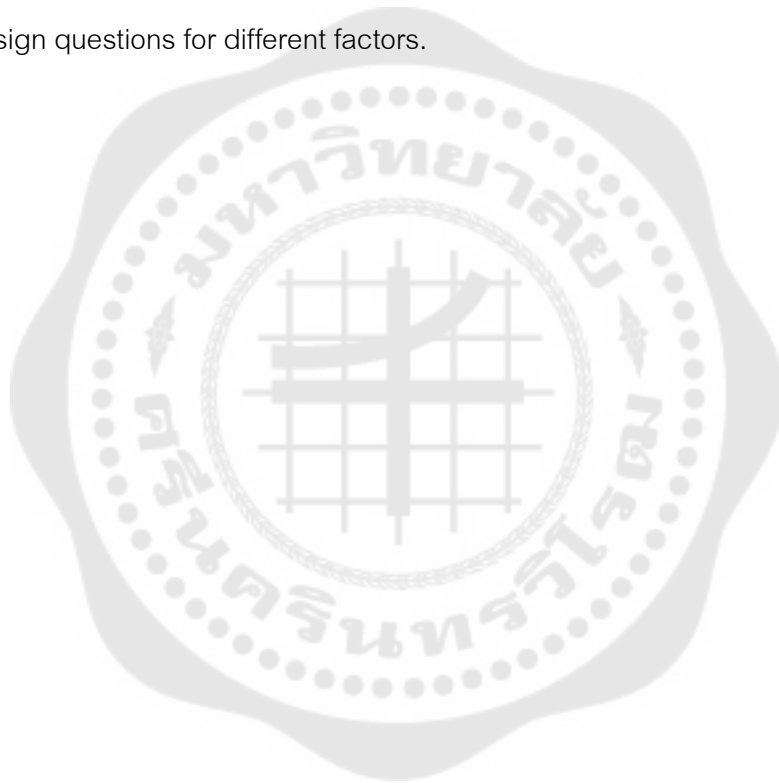
Open a live broadcast room and develop the mode of bringing goods to the live broadcast room

maintaining a brand community that allows customers to know the firm more intimately through peer-to-peer conversations will work in the firm's favor, even if negative information is shared. Also, we found that it is crucial for managers of brand

communities to focus on enhancing the quality of the information shared in the community, since it is the entire communication quality factor (including all the four dimensions of frequency, relevance, duration, and timeliness) that impacts customer purchase behavior.(Adjei, Noble, & Noble, 2010)

#### 4.5 Questionnaire

To better analyze the needs of the crowd, a questionnaire was designed. Before designing the questionnaire, I modeled the factors related to the virtual ride. Then design questions for different factors.



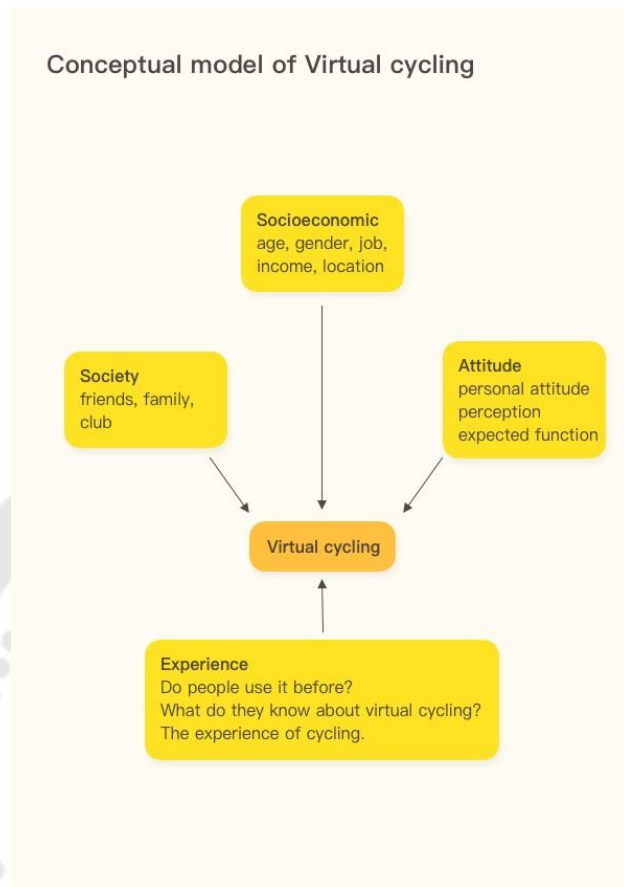


Figure 7 Conceptual model of virtual cycling

Source: by author

#### 4.6 MARKETING PLAN

Table 2 Marketing plan

options	quantity percentage
BUSINESS SUMMARY	The Development of Marketing Plan for a Virtual Cycling Application: The Case of Beijing China
BUSINESS OBJECTIVES	Explore and analyze the operation plan of bicycle virtual riding software in China (Beijing), analyze the specific needs of Chinese people.



Table 2 (Continued)

options	quantity percentage
THE PROBLEM	<p>How to create a bicycle virtual riding application suitable for Chinese people?</p> <p>What kind of strategies can help us solve the shortcomings of the software?</p>
OUR SOLUTION	<p>Invite cyclists to experience and publish videos before the app is launched to attract new users.</p> <p>Create hot spots on major social media, such as holding offline virtual bicycle riding experience activities.</p> <p>Enter the live broadcast platform and invite cyclists to experience virtual bicycle riding.</p> <p>Advertisement placement in bicycle races.</p> <p>Promote products according to the ranking of social media platforms most used by Chinese people.</p>
COMPETITIVE ADVANTAGE	<p>It is conducive to the development of social activities</p> <p>Not affected by environmental factors</p> <p>Adapt to the development of Internet</p> <p>It's safer to ride a bike</p>
TARGET MARKET	Cycling enthusiasts in Beijing

Table 2 (Continued)

options	quantity percentage
MARKETING STRATEGY & OBJECTIVES	<p>Product marketing strategy</p> <p>According to the analysis of the main marketing methods, it is difficult to promote foreign products directly in China. The reason is that the consumption habits of user groups are different, the support of third-party platforms is not in place, and users are more willing to choose products that can find relevant information.</p> <p>Therefore, the promotion plan should be designed from the above three aspects.</p> <p>Service marketing strategy</p> <p>There are obvious differences between service marketing and product marketing, which is formed based on the intangible, heterogeneity, inseparability, and nonstorage characteristics of service itself. Excellent service marketing should form users' perception in service quality, concept, responsibility attitude and so on.</p> <p>Virtual reality technology requires not only strong technical support, but also highquality customer service. Therefore, it is necessary to strengthen internal management, improve service quality, provide service quality commitment to customers, and formulate high standard service rules.</p>

## CHAPTER 5

### SUMMARY DISCUSSION AND SUGGESTION

#### 5.1 Result

##### 5.1.1 The marketing strategies, advantages, and disadvantages of mainstream bicycle virtual riding software

Virtual bike riding is a safe way to ride and exercise, and there are already several companies around the world offering this service. His advantages are very significant, safe, not affected by the weather environment.

Zwift has built a fitness world that is "part social media platform, part personal trainer, part computer game." This unique combination makes Zwift's APP appealing to both recreational riders and professionals who want to train outdoors.

One of the conditions for the company's success is that it can reach a wide range of users, from casual players to professionals, and provide excellent technical support, such as cycling milestones, professional post-race analysis, and open cycling clubs.

##### 5.1.2 The demand analysis of the population that can be used for domestic marketing

Through the analysis of the application development of virtual bicycle riding, the analysis of the usage habits of Chinese Internet users, and the analysis of the travel mode and fitness willingness of residents in Beijing, China, a virtual bicycle riding suitable for residents in Beijing, China is obtained. How the app is marketed.

As can be seen from the user story research, being able to communicate with friends is one of the main needs, in addition to participating in club activities and the sense of accomplishment of completing bicycle riding are also the needs of most users. However, the existing virtual bicycle riding software services abroad cannot meet these domestic needs.

##### 5.1.3 Establish marketing strategies for virtual cycling software in line with domestic commercial demand analysis

Through SWOT analysis, virtual bike riding applications benefit from the rapid development of the Internet. Since the activity can be carried out at home, the risk

of injury from outdoor riding is reduced, and it is not affected by weather and environmental factors. In recent years, due to the epidemic, the rapid development of Internet services has been promoted, which is conducive to the development of virtual bicycles. Since riding data will be saved and published, potential athletes can also be quickly discovered through the app.

In the case of sufficient number of users, continue to launch other sports models to cover a wider user group.

Virtual bicycle riding applications have not yet been popularized in China, and people know less about this new way of cycling, so it is an opportunity to develop such applications. By promoting virtual bike rides user can also spread the word about cycling and get more people to join.

## 5.2 Discussion

In Chapter 1 Background Investigation, virtual reality technology is now widely used in various fields. Applying virtual reality technology to cycling allows people to complete cycling training indoors. In addition, based on different purposes, some software allows users to ride in different places around the world. It can bring a realistic visual experience. When virtual reality technology is integrated into cycling competitions, cycling enthusiasts can experience the cycling routes of athletes first-hand.

Through analysis, we learned that there is no mature solution in China. The researchers experienced the existing software. As a new technology, there is currently no complete supporting equipment, so there is no good user experience.

The design concept of application software should be analyzed from the perspective of user usage habits, main travel modes, usage intentions, and the development of virtual riding software. Pay attention to the actual needs of users and establish a vibrant and sustainable community culture to further promote the brand and attract more users.

it is crucial for managers of brand communities to focus on enhancing the quality of the information shared in the community, since it is the entire communication

quality factor (including all the four dimensions of frequency, relevance, duration, and timeliness) that impacts customer purchase behavior.

### 5.3 Shortcomings and prospects for further research

The SWOT analysis method is based on the analysis of things at a certain moment and determines the basic direction of enterprise development or product design. However, when the external environment changes, it needs to be reassessed, and it is impossible to predict the future development.

This research is mainly based on specific regions in the post-epidemic era. Future research can make statistical research on future development trends.



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APPENDIX

Appendix 1 questionnaire of virtual cycling “○” means you can only choose one option.

“□” means you can choose multiple options.

Questions with “\*” means you must answer them.

What's your gender?

Male

Female

Where do you live? \_\_\_\_\_

What's your job?

Arts

Business

Communications

Education

Health care

Hospitality

Information technology

Law enforcement

Sales and marketing

Science

Transportation

Other (please specify) \_\_\_\_\_

Do you ride to company/attraction/shop?

Yes

No (please jump to question 6)

How often do you ride to company/attraction/shop?

Less than 2 times a week

Between 2 to 5 times a week

More than 5 times a week



How do you search for information?

Mobile phone apps

Website search engine

Ask people

Video website

Other (please specify) \_\_\_\_\_

Do you pay attention to current hot news?

Yes

No

Do you watch live broadcast?

Yes

No

Do you watch bicycle races? (Live viewing, live broadcast, video, etc.)

Yes

No (please jump to question 11)

How often do you watch bicycle races? (Live viewing, live broadcast, video,  
etc.) Never

Hardly

Often

Always

Which of the following brands do you know?

Zwift

Trainer Road

Wahoo System

Fulgaz

Rouvy

RGT cycling

Other (please specify) \_\_\_\_\_

None (please jump to question 14) \* Which brands do you prefer?

\_\_\_\_\_

Why do you prefer it? What is the most difference between other brands?

\_\_\_\_\_

Have you ever used virtual cycling software? (Such as: Wahoo Fitness, Zwift, kinomap, etc.)

Never use (please jump to question 27)

Sometimes (1-3 times a week)

Often (3-5 times a week)

Almost every day (over 5 times a week)

Do you think the virtual cycling software is easy to use? (Please rate)

☆☆☆☆☆

What type of virtual riding environment do you prefer?

Close to reality (Cycling scenes will be closer to reality, even including real streets) full of imagination (The riding scene is mainly science fiction, which is a fictional world) don't care about the riding environment

other\_\_\_\_\_

What do you typically use virtual ride software for? Realistic virtual worlds training programs

social interaction/community features

accurate power and cadence measurement freeride other\_\_\_\_\_

How likely are you to recommend it to a friend or family member? (Please rate)

☆☆☆☆☆

How important do you think social features and social interaction are in virtual cycling software? (e.g.: community clubs, leaderboards)

☆☆☆☆☆

Would you rather train with virtual ride software or freeride?

☆☆☆☆☆

Have you ever raced with virtual ride software?

Yes

No

Would you pay for the professional functions on virtual cycling software? (Such as: game appearance, training analysis, Coaching, etc.)

Yes

No

Not really

Which device do you like to use to take a virtual ride?

Smartphone Apps

Computer Software

Smart TV

Others \_\_\_\_\_

How would you rate the value for money? (The cost of virtual cycling)

☆☆☆☆

Will you buy products from a store in the virtual cycling apps? (Such as: bike, bike equipment, cycling clothing, etc.)

Yes

No

Not sure

What features do you wish virtual ride software could have or update?

Social functions professional competitions shopping functions clubs coaches

other (please specify) \_\_\_\_\_

What do you pay more attention to when purchasing a product?

Price

Functionality

Interaction

Other \_\_\_\_\_

Does anyone around you use virtual cycling software?

Friends

Family

Club members Other none

Do they recommend virtual cycling software to you?

Yes

No

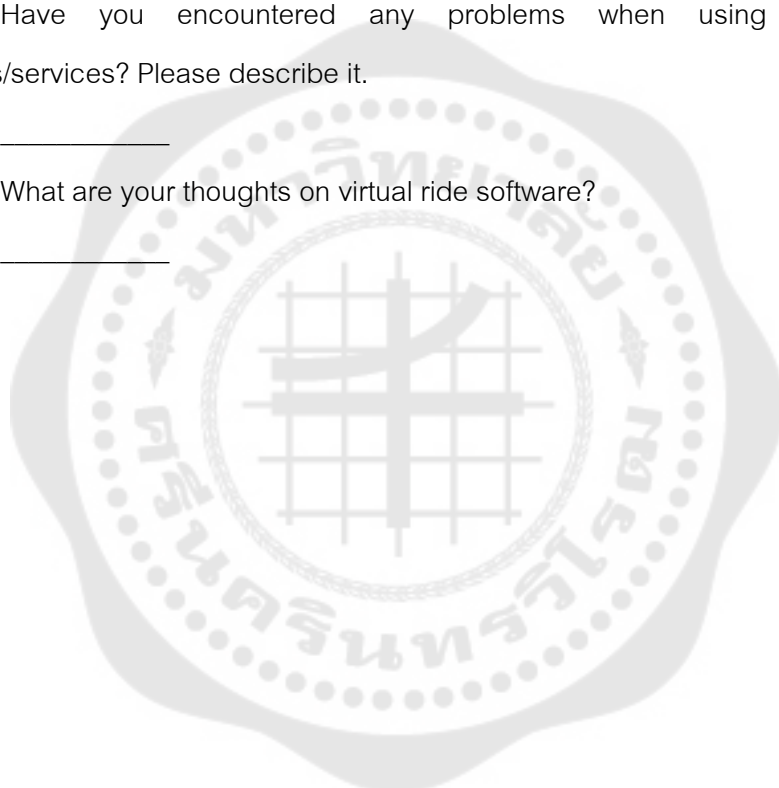
Not really

Have you encountered any problems when using virtual cycling products/services? Please describe it.

\_\_\_\_\_

What are your thoughts on virtual ride software?

\_\_\_\_\_



VITA

NAME

XIANG BOYAN

