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Sustainability of Game-Skills-Social-Application （Gssa）in Post-Epidemic Era: A Case Study of Tt

Gui Jun[1], Guo Yajie[2], Jamak Amrollahifar[3]

[1]School of Media and Art Design, Guangzhou Huali College, China, [2]School of Management, Guangzhou College of Technology and Business, China, [3]School of Business and Economics, UPM, Malaysia

Email: peakguijun@gmail.com, guoyajie202210@163.com, Jamak_far77@yahoo.com

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Abstract

The rapid growth of Game-Skills-Social-Applications (GSSA) during the COVID-19 pandemic has raised critical questions about their sustainability in the post-pandemic landscape. This study focuses on TT, a leading GSSA platform, to explore how such platforms can maintain user loyalty in an environment marked by declining online activity and intensifying market competition. Utilizing a conceptual model of user loyalty, the research employs Pearson correlation analysis and univariate regression to examine six key variables: Value Proposition, Brand Building, Trust and Security, Customer Service, Apps & Technology, and E-loyalty. Data was gathered from 221 active TT users in mainland China. Major findings indicate a significant positive correlation between these variables and user loyalty. Despite the challenges posed by the post-pandemic decline in user engagement, the study suggests that focusing on these variables can offer a pathway for GSSA platforms to sustain business. Future research may consider other types of online social entertainment products, thereby broadening the scope of understanding the sustainability of online platforms in a post-pandemic.

Keywords: E-loyalty**,** Value Proposition, Brand Building, Trust and Security, Customer Service and Apps & Technology, Sustainability, Integrated Marketing Communication

Introduction

The Background of Study

The COVID-19 epidemic, like other destructive events, has had a significant impact on the economy and human production and life (IMF, 2020). At the same time, the isolated government policy and digital media promoted consumers' large-scale use of technology and digital media among consumers during their stay in COVID-19 (Cruz-Cárdenas et al., 2021). At the same time, a large amount of information pushed by digital media makes consumers perceive risks, causing consumers to have different levels of negative emotions such as stress, sadness, anxiety, loneliness and cognitive dissonance (Song, Yao, & Wen, 2021). In this case, video games, like other online entertainment methods, provide temporary emotional transfer (Jameson, Trevena, & Swain, 2011).

The epidemic situation in COVID-19 has promoted the need to use digital solutions to deal with social isolation. In 2020, the number of game downloads in iOS and Google Play will be close to 130 billion, and both app stores have achieved a year-on-year growth of more than 10% (Annie, 2020). In this year, the actual income of Chinese mainland's game market was 278.687 billion Yuan, an increase of 47.81 billion Yuan compared with 2019, a year-on-year increase of 20.71%, which achieved an explosive growth. At the same time, the number of game users also maintained a steady growth, with the number of users reaching 665 million, a year-on-year increase of 3.7% (CGIGCa, 2020). The large demand not only brings many users and profits to the game industry, but also gives the development of peripheral products of the game industry. Among them, the most notable is the entertainment skill social industry.

The entertainment social industry is a comprehensive industry with entertainment as its core, entertainment, skill competition and social multi-latitude attributes. As the epidemic continues, the scale of entertainment skill industry is constantly rising every year. In 2020, the social industry of entertainment skills will reach 47.9 billion Yuan, accounting for 6% of the total online entertainment industry. The overall market size will be close to 100 billion Yuan in 2022 (iResearch, 2021). From the market segment of entertainment skill socialization industry, Game-Skills-Social-Application (GSSA) is still the most important part of the market, accounting for more than 50% of the market share (iResearch, 2021).

Although online games and its surrounding industries gained unprecedented prosperity during the epidemic, with the gradual relaxation of the epidemic prevention policy of China government, people's offline social activities gradually began to recover, and with the resumption of work and production, inflation pressure and many other factors, people began to gradually reduce their consumption demand for online games. From January to June, 2022, the actual sales revenue of China game market was 147.789 billion Yuan, a year-on-year decrease of 1.8%, and the number of game users was about 666 million, a year-on-year decrease of 0.13% (CGIGCa, 2020). With the decrease of game users, GSSA are strongly dependent on game users, so their business situation is bound to be affected.

In the past, demand was often regarded as the core driving factor of consumption, but many factors such as destructive events are challenging our traditional assumptions about consumption demand, including the core driving factors of demand: price, quality and convenience (PwC, 2022).

Therefore, this report focuses on how to maintain the electronic loyalty of companies in the GSSA under destructive events. In this study, Quwan, which is a representative of social companies with game skills, is selected as the research object. While providing suggestions for Quwan, it can also provide reference for other similar companies.

The Case of Study

Introduction of GSSA

Multi-player real-time combat games can be regarded as entertainment-oriented technology and a large-scale leisure system (Pallavicini, Pepe, & Mantovani, 2022). At the same time, the game mode based on team collaboration provides social opportunities for players, but the default player matching mechanism of most online games makes players in the team cause negative emotions such as disputes, abuse and slackness. Therefore, in order to give players a more detailed matching mechanism, an independent third-party team tool came into being (Annie, 2020). These tools subdivide the player matching mechanism by establishing interest groups for players and giving players more subdivided labels. At the same time, in order to

enable players to communicate and share more efficiently, it provides various functions such as voice communication, record display, leisure and entertainment, etc. (iResearch, 2021).
At the same time, people had to shift their social needs from online to offline during the epidemic. Software with leisure function, social function and light entertainment function is favored by users. Compared with conference software and online course software, GSSA focuses on gamers.
In 2020, the market size of game skill social industry in China will reach 26.6 billion Yuan. It is estimated that the compound growth rate of the overall market will reach 44.4% from 2018 to 2022, and it will still maintain a high-speed growth trend. With the continuous popularity of online games and e-sports industry, and the enrichment and progress of Internet-related interactive technologies, users' demand for GSSA to socialize continues to deepen, and the market continues to grow (iResearch, 2021).
The strong demand makes many games development companies, technology companies and software development companies increase their investment in this area, hoping to gain a place in the market. At the same time, similar requirements will inevitably lead these companies to develop similar products.

Introduction of TT

Quwan was established in Guangzhou in 2014 which is TT ‘s parent company. Its main businesses are Game-Skills-Social-Applications (GSSA), E-sports and game development (Quwan, 2021). Quwan's business is mainly directly users, and it also cooperates closely with other upstream and downstream enterprises, like Tencent, Netease, Wanmei and other large game development and operation companies are the cooperative companies of Quwan. As of September 2021, the overall income of Quwan was 1.17 billion RMB, and its profit reached 980 million RMB (Quwan, 2021).

Table 1

History of Quwan (Quwan, 2022)

Year	Content
2014	The company was established, and TT voice Apps was released.
2015	The customized distribution business went online, and the intermodal cooperation broke through 100 million.
2017	Business transformation and upgrading; Layout e-sports ecology; Won the award named "Top 100 Internet Enterprises in China"
2018	Won the title of "Innovative Enterprise in Guangdong Province (Pilot)"
2019	Won an award named "The Most Growing Enterprise in 2019"
2020	Layout of overseas markets; TT E-sports was established and settled in the home of E-sports; Won the title of "Top 20 Internet Enterprises in Guangzhou in 2020"
2021	Complete Series B financing with a total amount of USD 100 million.

Table 2
Quwan Company Culture (Quwan, 2021, 2022)

culture	content
Enterprise Mission	Let there be no lonely players in the world.
Corporate Vision	Connect 1 billion players around the world to create a new way of cultural life
Core Values	Integrity, love, efficiency and breakthrough.

GSSA is the main business of Quwan, and its main products is TT. TT is the core product. As the core product of Quwan, TT voice continues to expand with the scale of mobile game users and gradually becomes the main game skill social head product in the industry. As of June 30, 2021, more than 90% of TT voice users are under 30 years old, and the online generation has become the main user group. Moreover, the average daily use of voice chat social function exceeds 158 minutes, an increase of 45.6% compared with the same period in 2020 (MobTech, 2021). TT develops distinctive features according to the needs of gamers. For example, to build a community with gamers according to the social needs of gamers; Develop a unique player matching mechanism for the needs of high-end players; Develop a high-quality voice communication module for game developers in voice communication (iResearch, 2021).
In terms of E-sports, Quwan owns the top E-sports Clubs of League of Legends, the Glory of the King, Peace Elite, League of Legends Mobile and other E-sports events, and actively penetrates its influence into the e-sports circle as a professional league partner and maintains a high influence. And United Bank, real estate, logistics, e-commerce and other fields organize

e-sports. As of December 31, 2021, TT Voice and TT E-sports have held over 10,000 mass events, reaching over 1 million people (Quwan, 2022).

Research Problem

Change of Supply and Demand Has Challenged GSSA's Business Sustainability

People must be shut down at home because of the epidemic, and external communication has become one of the main needs. In the early stage of the epidemic, in order to meet many voices communication needs, many software development companies quickly produced the software to meet people's voice communication needs. Many most of the demand is accumulated, and the proportion of demand is greater than the proportion of supply, so it becomes a seller's market (Bell, Keeney, & Little, 1975). Therefore, software development companies are not worried about the lack of users, and many users are looking for voice communication software that can communicate with the outside world and is cheap. However, as the epidemic blockade time goes on indefinitely, people must download and install a variety of software to cope with various situations that they may encounter in order to cope with the increasing demand for life, work and entertainment. Many supply leads to the increase of software that users can choose, and the identity of users and software development companies changes, forming a buyer's market (Bell et al., 1975).

Before starting the research, we downloaded a variety of GSSA and analyzed their functions to make Table 3.

Table 3

Study of TT's Competitor

		TT	Lieyou	Diandian	Pipi	Guaizhu	YY
Company		Quwan	Lieyou	Taole	Lan Chen	yiyi shen	Jinhong
Function	Stranger gang up	√	√	√	√	-	√
	Relatives gang up	√	√	√	√	-	√
	Sing	√	-	√	√	√	√
	Moment	√	√	√	√	√	√
	Chat	√	√	√	√	√	√
	Make friends	√	√	√	√	√	√
	Voice lives	√	√	√	√	√	√
	Game live	√	-	-	-	-	√
	Video living	√	√	√	-	√	√

First, as a commercial company, the parent company of all applications will choose the function with great demand as the blueprint and starting point of product development. The main keywords of game social software are game and social, so many companies will develop it with this single demand. Therefore, almost all GSSA will develop software with voice, social

and game attributes. Although different companies have different understandings of products, there is not much difference in the purpose and functional forms of products, which leads to the application of functional approximation.

Secondly, in the face of fierce competition, all GSSA will choose to collect feedback from users and analyze the feedback from users to update their products in order to give their products a competitive advantage. This leads to the convergence of all similar products, and the loss of their own product differences and characteristics. When the differences and features of products are smooth, the mobility of social software users with different game skills is accelerated, which leads to the further reduction of user loyalty.

Finally, in the process of function blueprint and feedback update, users will feed back the advantages of different software to the manufacturers, which finally leads to the fact that all software integrates the advantages of all products, which makes it easier for users to use the software. But all software will combine all the advantages, and such advantages will become disadvantages and fall into a vicious circle. In this way, our products can't get the favor and advantage of users.

People reduced use social networking applications in the post-epidemic era

The traditional concept of brand loyalty includes three dimensions: cognition, emotion and behavioral intention (Tucker, 1964). Traditional brand loyalty development efforts rely on mass communication to build brand image to a great extent. However, in the special period of epidemic situation, users' cognition is mostly strengthened by customized data of enterprises, and users' active choices become less, instead of passive cognitive reinforcement. On the emotional side, apps play an emotional role by publicizing privacy protection and various security measures. Generally speaking, loyalty means satisfaction, but satisfaction is not the same as loyalty (Gommans, Krishman, & Scheffold, 2001). Therefore, there is an unequal relationship between loyalty and satisfaction (Waddell, Pepler, & Moore, 2001).

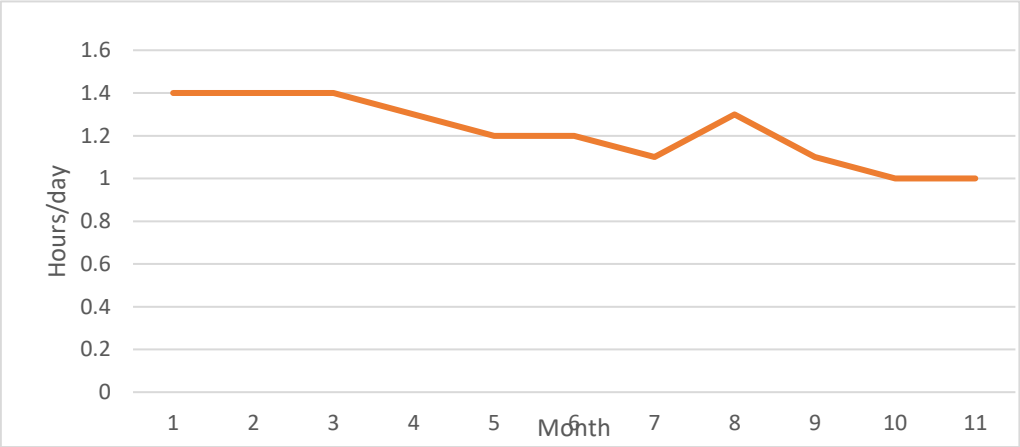


Fig. 2: Average Daily Online Time Of TT Users In 2020 (Quwan, 2021)

According to Fig. 2, from January to November in 2020, the overall average online time of users showed a downward trend. Faced with fierce market competition, the average online time of TT voice users decreased by 28.57% from 1.4 hours per day in January to 1 hour per day. This shows that although TT voice has a huge base of users, but in the face of strong competition, the dominant position in the market has received a huge threat. At the same time, according to the prospectus of TT voice, the revenue of TT voice is also facing greater pressure. In 2020, its revenue was 1493420000 Yuan, in 2021, Its revenue was 1173466 Yuan, and its consolidated revenue degraded by 21.42% (Quwan, 2021). Therefore, TT, as a GSSA

that has been in operation for many years and has a high brand awareness, although it has stable users and huge user technology, it will still face the challenge during the post-epidemic era.

Objectives and Questions for Research

Research Questions (RQ)

Many people have been disrupted and negatively affected by the global COVID-19 epidemic, which has disrupted their lives and their jobs. In the blockade state, governments issued their blockade policies at the right time, requiring people to stop in social activities and finish their work. People on the Chinese mainland were forced to stay home without the outside world for a long time under such circumstances. The prohibition of commercial activities, productive activities, and social activities makes social networking the choice of most people. To meet the explosion of social networking needs, a lot of network technology companies are making different social networking software.

Following the relaxation of blockade policies in a few countries, people are slowly returning to normal. The original strong social demand shrank in a short time, which led to fierce market competition. In order to find out our solutions to this special situation in the post-epidemic world, this study raises four research questions:

RQ1: Which factors support the development of GSSA in the post-epidemic era?

RQ2: How do these factors affect the development of GSSA in the post-epidemic era?

RQ3: Does GSSA still have business opportunities for sustainable development in the post-epidemic era?

RQ4: How can integrated marketing communication help GSSA achieve sustainable development in the post-epidemic era?

Research objectives (RO)

According to IResearch report, the entertainment and competitive social industry is expected to continue to grow at a compound growth rate of more than 40% in 2018-2022, with a market size of approximately 100 billion Yuan in 2022. Over 50% of the market share is attributed to social gaming skills, which are the most important component. Therefore, the purpose of this study is to determine the factors that support the development of GSSA in the post-epidemic era, and to explore the method of these factors affect GSSA's development in the post-epidemic era. As indicated in IResearch's report, the compound growth rate of social game skills will be 5.6% lower in 2020-2021 than in 2019-2020. Accordingly, the objective of this study is to find the sustainability business opportunities for GSSA in the post-epidemic era. Although the overall development trend of GSSA is developing in a better direction, there is also a crisis in GSSA due to many factors such as the unsealing of epidemic conditions, intensified competition, and weak global economic conditions. This study aims to investigate how Integrated Marketing Communications（IMC）can contribute to the sustainable development of GSSA.

Theoretical Contribution

Theoretically, this research will expand the application scope of brand loyalty in the electronic service market and increase data support and theoretical contribution for E-Loyalty. Through in-depth analysis of TT's factors affecting users' E-Loyalty during the epidemic period, the theoretical gap of E-Loyalty research will be filled.

Knowledge Contribution

In essence, this study is mainly a summary of the theories of the previous year's scholars and an expansion of its application scope. We will have a better understanding of the influencing factors of brand loyalty and provide theoretical basis for the next and future research.

Contribution To The Industry

In fact, this research is of great significance to the future development of electronic market. It has positive reference value for the electronic service mark et which is in fierce competition and the fierce competition under special conditions in the future. At the same time, expanding the application scope of brand loyalty can provide reference value for new brands.

The Research Scopes

The research scope determines the choice of follow-up samples and research methods. The following will define the scope of this research from the market scope, model or theoretical application scope and survey sample scope.

First, TT is mainly a game communication application that serves Chinese users. Its main service customers are mainly in Chinese mainland, so the market scope of this study is Chinese mainland.

Then, the focus of this study is E-Loyalty. Electronic service quality can help us better understand the relationship among various factors. This study will use E-Loyalty framework which from Gommans et al. to helps us understand the relationship between related factors. Its main variables include value proposition, brand building, trust and security, website and technology, and customer service.

Finally, this study will collect data by distributing questionnaires through the Internet. Because TT service object is online game players who take online gam es as the main body. So, this sample will choose online gamers as the sample of the questionnaire.

Literature Review

Value Propositions

Product customization and interactivity are two unique value propositions that contribute to e-loyalty in online behaviours. A recent Modem Media and Greenfield survey showed that most web shoppers prefer websites that offer customized products and information. This clearly indicates the importance of mass customization in creating e- loyalty. Customization is the result of the interactive involvement of the customer in the design of his/her ideal product.

Brand Building

Brand image building as a strategic tool for developing brand loyalty has been discussed a lot from both theoretical and managerial perspectives in the literature (Bhat & Reddy, 1998). In e-service the significance of brand building has increased with the exploding number of competitive choices that have appeared in a short period of time. The Internet offers unique tools of interactive bran d building that have previously not been available through traditional mass media-oriented brand-building strategies.

Trust and Security

Trust, particularly the unique dimensions of transactional security and privacy(Hoffmann, Kafatos, Janeway Jr, & Ezekowitz, 1999), play a critical role in generating customer loyalty to

an e-service. Several unique tools and techniques are available to e-service to enhance customer trust in their website. This includes third party approvals, encryption, authentication, and non-repudiation strategies. Encryption assures data security in transmission, authentication guarantees the identity of the participants involved in the electronic contract, and non-repudiation means maintaining an authentic transcript of the specific terms and conditions of the contract agreed to by both parties.

Trust, which is closely related to security, is a very important factor in the online buying process behaviours process. In general, you cannot feel, smell, or touch the product. You cannot look into the salesperson's eyes. Therefore, these ways of developing trust are excluded on the Internet. Brand trust usually contributes to a reduction of uncertainty. In addition, trust is a component of the attitudinal component of loyalty.

Apps & Technology

A unique factor in e-loyalty is the critical role of the first impression created by a e-service as well as its ease of use(Smith, 2000)-easy navigation, fast page loads, server reliability, quick shopping and checkout processes, and a personalized interface.

Customer Service

Customer service is another crucial area for e-marketers(Helmsley, 2000). A customer who uses something on the Internet has one major disadvantage compared to a customer in real space. Internet customers cannot touch, smell, or experience the good before they use it. In order to minimize this insecurity, an e-service should offer brands that are well-known, good product quality, and, of course, guarantees.

Likert-Type Scale

In the survey design, this study will adopt the 5-point of "level of agreement" in the Likert type scale, details as follows:

➢ "1 - Strongly disagree"
➢ "2 - Disagree"
➢ "3 - Neither agree nor disagree"
➢ "4 - Agree"
➢ "5 - Strongly agree"

Research Method & Design

In order to achieve the research goal, this study will adopt quantitative research methods. This study will take TT pronunciation as the research object, aiming at exploring the commercial landscape of social products of game skills from the research object. Methods Quantitative emphasis was placed on objective measurement and sample survey, data were collected and processed by questionnaire survey, and the feedback statistics were processed by computer technology, to summarize or explain specific phenomena. Therefore, this study selects quantitative research methods to identify and analyze the impact, challenges and opportunities of GSSA in the post-epidemic era.

The Concept Framework and Research Hypothesis Development

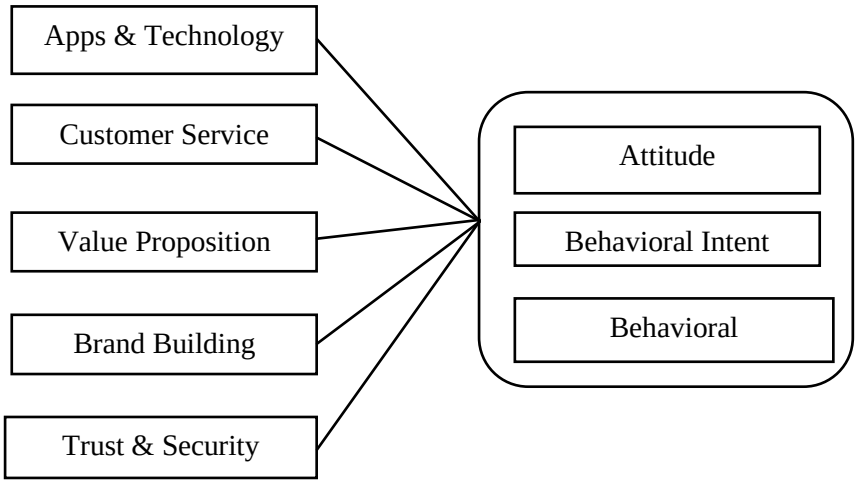


Fig 2 : The Concept Framework (Gommans et al., 2001)

This concept framework shows that E-loyalty consists of three dimensions: attitude, behavior and behavioral purpose, which influence each other. It contains 4(five) independent variables: (1) Value Proposals (2) Brand Building (3) Trust and Security (4) Apps & Technology and (5) Customer Service and 3(three) dependent variables:(1) Attitude (2) Behavioral Intent (3) Behavioral

Through the conceptual model, we put forward the following research hypothesis :

- **H1a:** Apps & Technology has a positive effect on Attitude.
- **H1b:** Apps & Technology has a positive effect on Behavioral Intent.
- **H1c:** Apps & Technology has a positive effect on Behavioral.
- **H2a:** Customer Service has a positive effect on Attitude.
- **H2b:** Customer Service has a positive effect on Behavioral Intent.
- **H2c:** Customer Service has a positive effect on Behavioral.
- **H3a:** Value Proposition has a positive effect on Attitude.
- **H3b:** Value Proposition has a positive effect on Behavioral Intent.
- **H3c:** Value Proposition has a positive effect on Behavioral.
- **H4a:** Brand Building has a positive effect on Attitude.
- **H4b:** Brand Building has a positive effect on Behavioral Intent.
- **H4c:** Brand Building has a positive effect on Behavioral.
- **H5a:** Trust and Security has a positive effect on Attitude.
- **H5b:** Trust and Security has a positive effect on Behavioral Intent.
- **H5c:** Trust and Security has a positive effect on Behavioral.

Research Methodology

This study will use quantitative research methods to collect data to prove or refute the research hypothesis put forward in Chapter 2. This research mainly discusses the influence of users' variables in five dimensions on E-loyalty. The most popular game voice communication application, TT has a large number of users, Hence, the quantitative method plays a very good role in this aspect, and its high universality enables the selected samples to represent a wider population (Hair, 2009).

In addition, we will use quantitative methods to collect data. First, the survey can be summarized. That is, the object sample is selected by a specific sampling technique. This enables these sampling objects to represent specific groups (Mathers, Fox, & Hunn, 1998),

which can make the object of this survey (TT users) more representative. Secondly, the survey usually explores users' behaviors and attitudes (Mathers et al., 1998), which is conducive to studying TT users' behavior and behavior trends. Finally, the survey is an economical, effective and convenient quantitative method. We can use online questionnaires to reduce the research cost. Quantitative research is adopted in many previous studies, which proves that the quantitative research is feasible.

Research Instrument

The respondents' feedback helps to explain what consumers value the most in GSSA To achieve the aim, a survey questionnaire is an ideal option. Due to the pandemic practice, an online survey will be conducted. The online survey will be both cost and time-efficient and able to provide market measurement.

In this study, the research tools of Gommans (2012) and other scholar were optimized and modified according to the actual situation of this study, and Table 4 was made.

Table 4
Research Instrument

Items	Source
Apps & Technology	(Gommans et al., 2001)
AT1: TT's page loads fast	
AT2:TT is easy to navigate/browse	
AT3:TT can set personalized website features	
AT4:TT Designed for targeted customer segments	
AT5:TT has language options	
AT6:TT has effective search functions	
AT7: TT's server always reliability	
AT8:TT full of content	
AT9: TT's checkout processes is quick	
Customer Service	(Gommans et al., 2001)
CS1: TT was fast response to customer inquiries	
CS2:TT was easy to contact	
CS3:TT was free online applications	
CS4:TT was easy to payment	
CS5:TT has user reward system	
Value Proposition	(Gommans et al., 2001)
VP1: TT has very kinds of customized products	
VP2:TT has large set of choices	
VP3: Product in TT has high quality	
VP4:TT has guarantees trade	
VP5:TT is a well-known brand	

VP6: Product pricing in TT is suit for me	
Brand Building	(Gommans et al., 2001)
BB1: The sound quality of TT is very clear	
BB2: I have a good experience every time I use TT	
BB3: There is no cheating on TT	
BB4: TT allows me to freely choose whether to continue using it	
BB5 ： TT has large involvement in brand image building	
BB6TT has join community building	
Trust and Security	(Gommans et al., 2001)
TS1: I trust TT very much	
TS2:TT is supervised and approved by the third party.	
TS3:TT protects my privacy	
TS4:TT has a good repute ion.	
TS5:TT has high reliability.	
TS6:TT useful Authentication	
TS7:TT is non-repudiation.	
Attitude	(Bernardo, Marimon, & del Mar Alonso-Almeida, 2012)
AT1: I enjoy the multimedia information, suggestions, and recommendations provided to the customer on this apps	
AT2: I think it is great fun to use this apps	
AT3: When interacting with this apps, I do not realize how much time has elapsed	
AT4: I enjoy sharing comments and experiences from another user	
AT5: I really enjoy play at this apps	
Behavioral Intent	(Bernardo et al., 2012)
BI1: The prices of the products and services available at this site are economical	
BI2: Overall, using this apps are convenient	
BI3: This apps gives me a feeling of being in control	
BI4: Overall, this apps gives me value for my money and effort	
BI5: The experience of this apps has satisfied my needs and wants	
Behavior	(Bernardo et al., 2012)
BE1: I encourage friends and relatives to do business with this apps	
BE2: I say positive things about this apps to other people	
BE3: I will pay more time with this apps in the next few years	

Sample and Data Collection

Sampling Technique

In this study, snowball sampling will be used. Snowball sampling refers to randomly selecting some interviewees with the characteristics needed for research, then inviting them to provide other interviewees belonging to the overall research object, and selecting follow-up interviewees according to the formed clues (Brewerton, Millward, & Ebrary, 2001). The advantage of snowball sampling is that it can control the samples according to some sample characteristics, to find the appropriate survey objects more pertinently.

This study was initiated jointly with Quwan and them provided TT official community group (on WeChat) to distribute survey, so we can more conveniently use the snowball sampling method to collect data for this study.

Population and Sample Size

Although the larger the sample size, the less likely it is to find errors, but when the sample size exceeds a certain scale, the diminishing returns will appear quickly (Gil, Andres, & Martinez, 2007). In order to ensure the validity of brand loyalty variables, the survey object of this study needs to be users who have used TT, which will reduce the total number of samples to some extent. The online community group provided by Quwan for this study has 471 users, according to the sample size table from Krejcie & Morgan, this study needs to collect at least 210 valid data to complete.

Table 5

Table for Determining Sample Size from a Give population (Krejcie & Morgan, 1970)

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2600	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368

140	103	700	248	10000	370
150	108	750	254	15000	375
' 160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note. -N is population size.
S is sample size.

Design and Production of Survey

The survey design of this study consists of two parts. The first part is demographic information, including age, occupation, income, and gender education level. The second part adopts the research tools provided by Table 4.

After combining the characteristics of online community groups and the need to collect effective data quickly, the questionnaire carrier decided to adopt an online survey. In this study, WENJUANXING (www.wjx.cn) is selected as the platform for making, publishing and receiving, which can quickly collect valid surveys and simultaneously detect the number of valid data.

Data Collection Process

After designing the survey on Wenjuanxing, it will generate a survey link and QR code. We paste this QR code on the poster, which was designed in advance, and then send this poster to the community group and encourage all users to become respondents.

Data Analysis

Once the collected data has been compiled, it can be analysed. This study will analyse the data using SPSS Statistics during the data analysis phase. Data analysis will analyse the data validity and reliability. As soon as reliability and validity are achieved, I will conduct a correlation analysis between the independent variable and the dependent variable and draw a correlation conclusion.

- **Descriptive Statistics**

This study will statistics the demographic portion of the collected data. Analyze the respondent's age, occupation, income, gender, education, and other factors for descriptive analysis, using mean, percentage, and other methods from a macro perspective, to judge whether the data conform with the basic characteristics of game voice software users.

- **Reliability Analysis**

This study used quantitative analysis method and research instrument that must use to be a scale, it was very important for the respondents to answer the scale honestly. In this part, will use Cronbach's coefficient alpha as a reference, and use SPSS Statistics to count all variables for testing. If $\alpha > 0.6$, it is accepted as credible data, otherwise it is not accepted.

Although this study uses a proven scale, there are also situations where the design is unreasonable or inapplicable, so it is also very important to check whether the scale design is

effective before conducting in-depth analysis. In the validity test section, I tested the validity of the scale by KMO (Kaiser-Meyer-Olkin) and Bartlett sphericity test through SPSS Statistics, if KMO ≥ 0.7, and Bartlett sphericity test Sig. = 0.0000, then the scale the validity is suitable, and further analysis can be carried out. On the contrary, it is necessary to optimize the scale and redo the data collection.

- **Linear Regression Analysis**

This study uses Linear Regression Analysis (Python) to demonstrate a linear regression relationship between 2 variables. In the process of proof, the hypothesis proposed will be verified through analysis of variance, regression coefficients and regression standardized residuals.

In the analysis of variance, the test level is 0.05, which tests the F-value and P-value levels to see if there is a correlation between the two variables. In a regression system test, a t-test is used to see if there is significant significance. Check whether the independent variables have collinearity problems by tolerance and VIF value. Use planning standardized residuals histograms and P-P plots to see if the data fit a normal distribution.

Findings

Demographic of This Study

The first part of the questionnaire is to collect the demographic information of the interviewees in order to get the background of the interviewees. A total of 221 responses were collected within 2 weeks of data collection.

According to the collected data, 52.5% of the respondents were male and 47.5% were female. The age of interviewees is mainly concentrated in 18-30 years old, accounting for 66.1%, accounting for most of the study population. Among the interviewees, the proportion of workers is 50.2, which is the key group in this study, followed by teachers (17.6%) and students (16.3%). Among the interviewees, the majority have bachelor's degrees, accounting for 54.3%, followed by master's degrees (27.6%) and high school students (11.3%). The income of respondents is more than 3,000 Yuan per month, accounting for 81.9%. It is worth noting that 16.3% of respondents earn less than 2,000 Yuan per month.

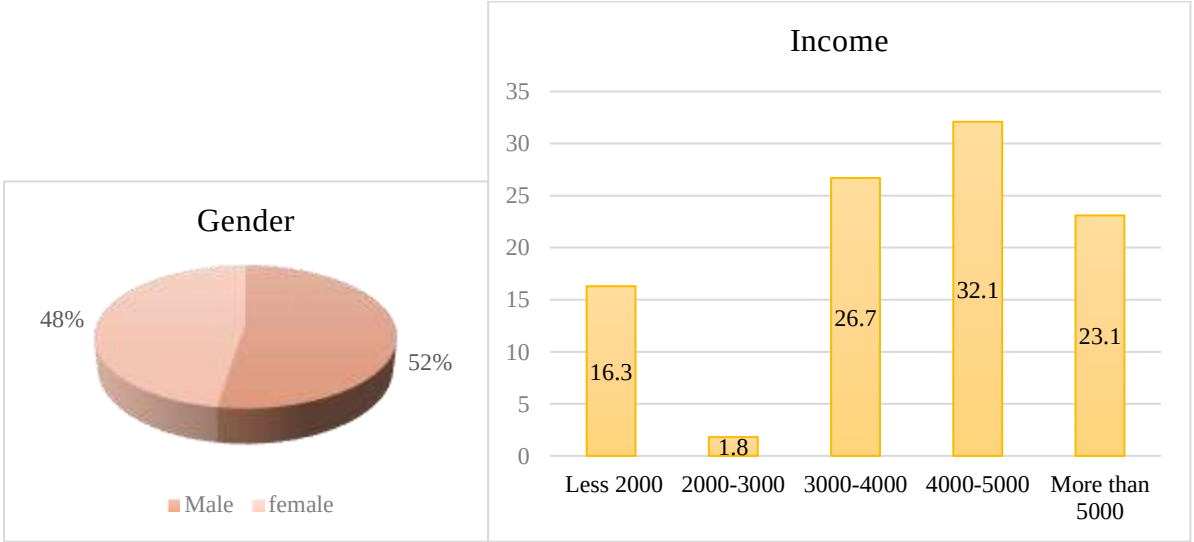
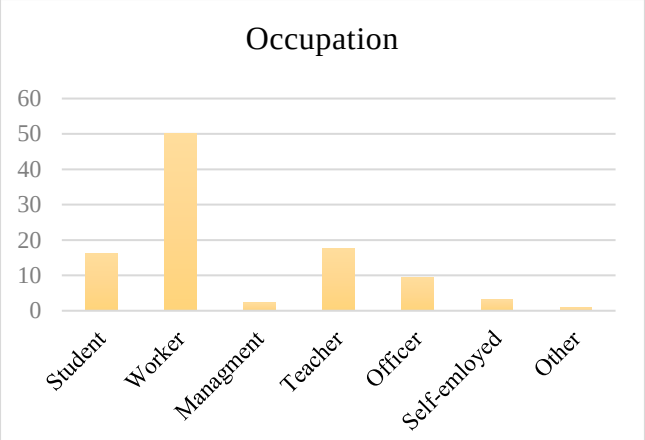
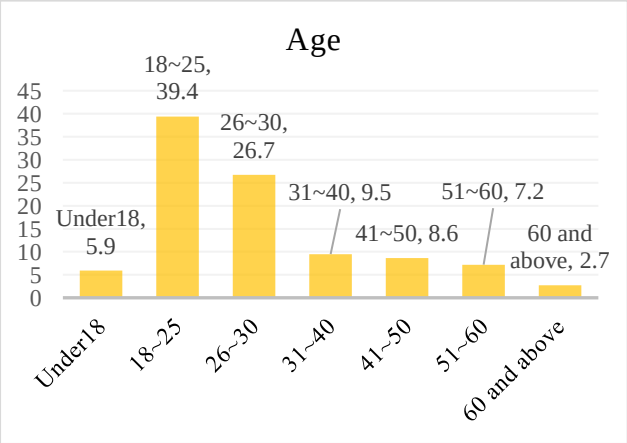
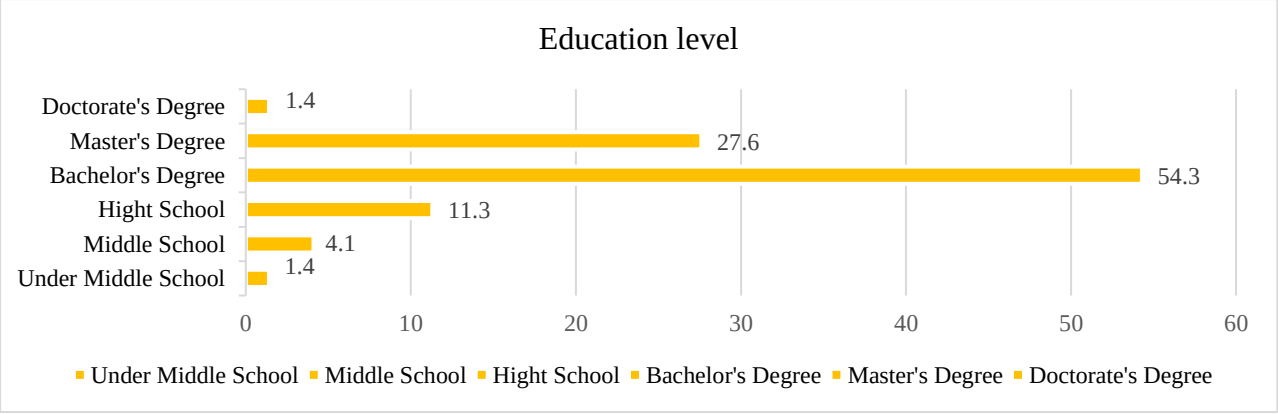


Fig. 4: Demographic of respondents







Therefore, we have reason to believe that highly educated, high-income male migrant workers have become the main social groups of game skills. Game social software opens social channels and a platform for them to show themselves while helping them to have fun. What we need to pay special attention to is that 1/5 of the user groups (16.3%) earn less than 2,000 RMB per month, which also proves that game social software occupies a large share among low-income people, who include students, the unemployed, and many people who earn income in urban areas for other reasons. At the same time, 18-25-year-olds have become the main force of GSSA, which also proves that the Internet generation's social interaction in the virtual network environment has become a major part of their daily life.

Reliability Analysis of This Study

Reliability of the instruments refers to the degree to which an instrument supplies consistent results if repeated and the degree to which a measurement is free of random or unstable error. The reliability of the measures was assessed based on the Cronbach alpha coefficient in

assessing the quality of the instrument. A reliability analysis using Cronbach's alpha was performed on all items to check for internal consistency of measuring items under each construct.

In this study, five independent variables and three dependent variables were selected, and 47 items participated in the reliability test. As shown in Table 6, summary Cronbach's Alpha (α) value is 0.943. Alpha value ≥0.8, so the overall reliability is within a reasonable range, showing high reliability. Any Cronbach's alpha (α) value which is, 0.60 to 0.70 is considered as reliable measure. Based on the pilot study, the result of Cronbach's alpha for all constructs are above 0.8. As tabulated in Table 6, the value of Cronbach's alpha is recorded to be between the ranges of 0.725 to 0.948. Hence, it can be concluded that all constructs are reliable to be applied in this study. Following the reliability test, the convergent and discriminant validity using confirmatory factor analysis was conducted after the final data collection.

Table 6:
Summary Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.944	.938	46

Table 7:
Reliability Statistics

No	Reliability Statistics	Total Items	Cronbach's alpha
1	Apps & Technology	9	0.725
2	Customer Service	5	0.802
3	Value Proposition	6	0.788
4	Brand Building	6	0.807
5	Trust and Security	7	0.777
6	Attitude	5	0.942
7	Behavioural Intent	5	0.949
8	Behaviour	3	0.938

Descriptive Statistics of This Study

This study used descriptive analysis to measure the average value of samples. The average value is used as an indicator to measure consumer interest and behavior. Use the 5-points Likert scale to measure variables, from 1 (Strong disagree) to 5 (Strong agree). The analysis results show that the average value of each variable is higher than 3, and the detailed average value and standard deviation of each structure and variable are as follows:

Table 8:
Properties of Measurement Items

Dimensions	Items	Mean	Std. Deviation
Apps & Technology		**3.960**	**0.537**
	AT1: TT's page loads fast	3.890	0.821
	AT2:TT is easy to navigate/browse	3.920	0.997
	AT3:TT can set personalized website features	3.380	1.120
	AT4:TT Designed for targeted customer segments	3.990	0.993
	AT5:TT has language options	4.140	0.908
	AT6:TT has effective search functions	4.100	0.953
	AT7: TT's server always reliability	4.220	0.826
	AT8:TT full of content	4.020	1.004
	AT9: TT's checkout processes is quick	3.990	0.993
Customer Service		**3.906**	**0.561**
	CS1: TT was fast response to customer inquiries	3.820	0.968
	CS2:TT was easy to contact	4.040	0.936
	CS3:TT was free online applications	4.090	0.920
	CS4:TT was easy to payment	4.100	0.929
	CS5:TT has user reward system	3.830	0.943
Value Proposition		**3.916**	**0.701**
	VP1: TT has very kinds of customized products	3.670	1.030
	VP2:TT has large set of choices	3.790	1.041
	VP3: Product in TT has high quality	4.000	1.040
	VP4:TT has guarantees trade	4.070	0.982
	VP5:TT is a well-known brand	4.070	1.014
	VP6: Product pricing in TT is suit for me	3.790	1.011
Brand Building		**3.699**	**0.622**
	BB1: The sound quality of TT is very clear	4.020	1.004
	BB2: I have a good experience every time I use TT	3.400	1.146
	BB3: There is no cheating on TT	3.460	1.162
	BB4: TT allows me to freely choose whether to continue using it	3.500	1.131
	BB5：TT has large involvement in brand image building	3.450	1.145
	BB6TT has join community building	4.140	0.908
Trust and Security		**3.736**	**0.693**
	TS1: I trust TT very much	4.100	0.953
	TS2:TT is supervised and approved by the third party.	4.220	0.826
	TS3:TT protects my privacy	4.020	1.004
	TS4:TT has a good reputation.	3.400	1.146
	TS5:TT has high reliability.	3.460	1.162
	TS6:TT useful Authentication	3.500	1.131
	TS7:TT is non-repudiation.	3.450	1.145
Attitude		**3.379**	**1.059**

	AT1: I enjoy the multimedia information, suggestions, and recommendations provided to the customer on this apps	3.440	1.176
	AT2: I think it is great fun to use this apps	3.220	1.210
	AT3: When interacting with this apps, I do not realize how much time has elapsed	3.320	1.194
	AT4: I enjoy sharing comments and experiences from another user	3.420	1.171
	AT5: I really enjoy play at this apps	3.500	1.127
Behavioral Intent		**3.967**	**0.596**
	BI1: The prices of the products and services available at this site are economical	3.450	1.145
	BI2: Overall, using this apps are convenient	3.440	1.176
	BI3: This apps gives me a feeling of being in control	3.220	1.210
	BI4: Overall, this apps gives me value for my money and effort	3.320	1.194
	BI5: The experience of this apps has satisfied my needs and wants	3.420	1.171
Behavior		**3.471**	**1.081**
	BE1: I encourage friends and relatives to do business with this apps	3.460	1.162
	BE2: I say positive things about this apps to other people	3.500	1.131
	BE3: I will pay more time with this apps in the next few years	3.450	1.145

According to the above table, the overall average value of apps & technology is, M=3.9603, SD= 0.537. Since the median value of the average is 3 (three), the average indicates that respondents agree that apps & technology is an important factor affecting their use of GSSA. It is worth noting that the average value of TT's server always reliability is 4.220, which is the highest among all the average values, indicating that users are concerned about GSSA's continuous service.

For customer service, the average value is 3.906, SD= 0.561, which proves that this is a one of important factor for respondents to use GSSA. From the perspective of individual structure, the average value of TT's free use and cashless payment methods is higher, which indicates that respondents attach great importance to these two factors when using GSSA.

As far as value proposition is concerned, M= 3.916 and SD=0.701. Respondents believe that this factor is one of the important signs that distinguish it from other GSSA. Therefore, TT's brand reputation, product/service quality and secured transaction are the three options with the highest average. It reflects the advantages of TT in providing differentiated services.

According to the collected data, the overall average value of brand building is 3.699, and the standard deviation is 0.622. Compared with other independent variable, brand building is less important in influencing which GSSA respondents choose to use. However, this study also

found that respondents showed strong affection for TT's participation in community building (M=4.140).

Overall average value of trust and security is 4.140, SD=0.908. Most of the respondents expressed their concern about personal privacy to some extent, so the average value of rust and security is the highest among all independent variables. At the same time, respondents also expressed support for the actions of third-party supervision.

In terms of dependent variables, due to the influence of consumers' subjective consciousness, the average values are low and individual differences are large. The average value of Attitude is M=3.379 and SD=1.059, which mainly shows that the respondents who like to use TT are slightly higher than those who don't. The mean value of behavioral intention is M=3.967, SD=0.596, which mainly shows the convenience and entertainment of TT. The average value of Behavior is M=3.471, SD=1.081, which mainly shows the satisfaction gained by sharing with others.

Linear Regression Analysis of This Study

The purpose of this study is to find out the factors that affect the sustainability of social application of games in the post-epidemic era. Therefore, as mentioned above, we will use linear regression analysis to test the hypotheses form Paragraph 3.1.

Table 9:
Verify the Research Hypothesis

		Unstandardized Coefficients		Standardized Coefficients				
Hypothesis		B	Std. Error	Beta	t	p	VIF	Decision
H1a	AT to AD	-1.019	0.153	-0.516	-6.679	0.000	10.759	Unsupported
H1b	AT to BI	0.576	0.072	0.519	8.023	0.000	10.759	Supported
H1c	AT to BE	-0.876	0.104	-0.435	-8.422	0.000	10.759	Unsupported
H2a	BB to AD	1.033	0.087	0.606	11.937	0.000	4.644	Supported
H2b	BB to BI	-0.099	0.041	-0.103	-2.433	0.016	4.644	Unsupported
H2c	BB to BE	0.584	0.059	0.336	9.896	0.000	4.644	Supported
H3a	CS to AD	-0.141	0.173	-0.075	-0.811	0.418	15.2	Unsupported
H3b	CS to BI	0.445	0.082	0.419	5.456	0.000	15.2	Supported
H3c	CS to BE	-0.214	0.118	-0.111	-1.804	0.073	15.2	Unsupported
H4a	TS to AD	1.002	0.063	0.656	16.000	0.000	3.02	Supported
H4b	TS to BI	0.186	0.029	0.216	6.301	0.000	3.02	Supported
H4c	TS to BE	1.45	0.043	0.929	33.930	0.000	3.02	Supported
H5a	VP to AD	-0.032	0.041	-0.021	-0.774	0.440	1.347	Unsupported
H5b	VP to BI	-0.08	0.019	-0.094	-4.121	0.000	1.347	Unsupported
H5c	VP to BE	0.016	0.028	0.01	0.569	0.570	1.347	Unsupported

From the above table analysis shows that:
The regression coefficient of VP is -0.032 (t=-0.774, p=0.440>0.05), which means that VP has no influence on AD. The regression coefficient of BB is 1.033 (t=11.937, p=0.000<0.01), which means that BB has a significant positive influence on AD. The regression coefficient of TS is 1.002(t=16.000, p=0.000<0.01), which means that TS will have a significant positive influence on AD. The regression coefficient of overate is -1.019 (t=-6.679, p=0.000<0.01), which means that overate has a significant negative influence on AD. The regression coefficient of CS is -0.141 (t=-0.811, p=0.418>0.05), which means that CS has no influence on AD. The regression coefficient of VP is -0.080(t=-4.121, p=0.000<0.01), which means that VP has a significant negative influence on BI. The regression coefficient of BB is -0.099 (t=-2.433, p=0.016<0.05), which means that BB has a significant negative influence on BI. The regression coefficient of TS is 0.186 (t=6.301, p=0.000<0.01), which means that TS will have a significant positive influence on BI. The regression coefficient of AT is 0.576 (t=8.023, p=0.000<0.01), which means that AT has a significant positive influence on BI. The regression coefficient of CS is 0.445 (t=5.456, p=0.000<0.01), which means that CS has a significant positive influence on BI. The regression coefficient of VP is 0.016 (t=0.569, p=0.570>0.05), which means that VP has no influence on BE. The regression coefficient of BB is 0.584 (t=9.896, p=0.000<0.01), which means that BB has a significant positive influence on BE. The regression coefficient of TS is 1.450 (t=33.930, p=0.000<0.01), which means that TS will have a significant positive influence on BE. The regression coefficient of AT is -0.876 (t=-8.422, p=0.000<0.01), which means that AT has a significant negative influence on BE. The regression coefficient of CS is -0.214 (t=-1.804, p=0.073>0.05), which means that CS has no influence on BE.

Discussion of Findings

This section discusses the findings and data from the research to achieve the research goal. In this part, we will discuss the demography, the behavior habits of users of GSSA in the post-epidemic era, and the art that affects GSSA to achieve research objectives.

The Factors Which Support the Development of GSSA in the Post-Epidemic Era

With the improvement of people's living standards, the middle class is growing, especially the millennial generation has gradually become the main consumer. Their demand for products is no longer limited to meeting basic physiological needs, but they are willing to enjoy spiritual satisfaction at the same time. Using GSSA is a means to please themselves, so users are using it to make themselves happy and satisfied with the process of using it. In this study, users identify with independent variables, such as value proposition, brand building, trust and security, customer service and application and technology. The sub-items included in the independent variables, such as usage process, payment, customer service, free functions, brand reputation, third-party supervision, privacy protection, community participation and social responsibility, are proved to have positive significance in supporting users to use GSSA applications continuously.

To sum up, users' attention to GSSA of consumer safety, functional design, social responsibility and privacy protection, which will affect the development of GSSA in the post-epidemic era.

The Effect Methods to GSSA's Development in The Post-Epidemic Era

As in paragraph 5.1, users identify with many independent variables, such as value proposition, brand building, trust and security, customer service and application and

technology, and many sub-projects contained therein. This study holds that socializing during the epidemic is the primary demand of all users to use social software with game skills. However, with the unsealing of the epidemic, users' demand for virtual social interaction on software with game skills will obviously decrease, and more and more users will be freed from the blockade to engage in real social interaction.

This background means that users' dependence on GSSA's social needs is decreasing. Driven by self-satisfied consumer value proposition, people are more willing to get a safer, more convenient and more efficient social environment in GSSA. And get high-quality social interaction in the process. Therefore, this study shows that the method to influence users to continue using GSSA in the post-epidemic era is to provide users with a safer, more convenient and more efficient social environment.

The Sustainability Business Opportunities for GSSA In the Post-Epidemic Era

In the post-epidemic era, people need to get out of blocked virtual socialization and move towards real socialization, which is a challenge to the GSSA based on virtual socialization, but that doesn't mean it won't have development opportunities. From the current situation, we can find more development opportunities. In several levels of users of GSSA, heavy users aren't going to be greatly reduced by the unsealing of the epidemic, but middle users are the ones we've got to fight for. This study suggests that middle users should be our main development target. It's easy to distinguish users and organize marketing contacts when people get back to work and study one after another. The spread of contacts is conducive to the development of users and the formation of group communication. Also, a constant flow of people helps us find the right marketing opportunity. Also, fragmentation is going to be a new growth point for socializing game skills. In this study, it was found that people's time is fragmented at work and in school, so they can use game social apps during that time.

Integrated Marketing Communications（IMC）can contribute to the sustainable development of GSSA

IMC is a marketing concept and method that combines a bunch of marketing tools and methods, and then adjusts them based on the environment, so that both parties get value out of the interaction. Marketing integration means integrating independent marketing into a whole to make it work. The independent marketing tools include brand communication, advertising, direct marketing, sales promotion, personnel promotion, packaging, sponsorship, and customer service. To target customers, GSSA's parent company can use IMC tools like advertising, online marketing, public relations, direct marketing, and sales activities based on the characteristics of GSSA. In addition, it's important to come up with marketing strategies and tactics based on this study's respondents. That company implements strategies through IMC tools, so we'll be able to develop our business sustainably.

Conclusion

Especially in the gaming skill social applications, the epidemic has affected business to some extent. The Covid-19 has broken the original business and user boundaries, from the massive influx of users at the beginning to the massive loss of users during the epidemic era. In the post-epidemic era, gamers will face more competition in the face of diverse choices as gaming skills social applications become an increasingly important branch of online entertainment. There are a few practical implications that Frank Laurent Coffee Roasters can consider when developing marketing strategies:

Content Optimization. Continue to optimize the product for important items in the independent variables of Value Proposition, Brand Building, Trust and Security, Customer Service, and Apps & Technology, such as matching efficiency, page load speed, privacy protection, information presentation, and sharing capabilities. In order to achieve high user loyalty, optimize the product's content in order to enhance user recognition.

Demonstrate Social Responsibility. In terms of social responsibility, GSSA needs to be linked to its own product characteristics and can reach out to different communities such as companies, factories, and universities. By activating the social atmosphere in these places, the brand's social responsibility can be enhanced by holding different types of game skill competitions or other types of social activities.

Increase Brand Touchpoints. GSSA belongs to online virtual social software. Therefore, offline brand contacts are relatively rare. For example, in public transportation, office buildings, factories, and universities, brand contact content should be arranged in accordance with the scenes where target people are most likely to appear.

Optimize the Price of Products. As compared to other products, GSSAs are dominated by young Internet Natives, who are more proficient at using Internet products than others. Internet usage becomes an inaccessible part of their lives. It is symbolic and emotional in nature. In addition, according to this study, they earn a low to middle income, so they are willing to pay for virtual products, but have an average ability to consume goods and are more sensitive to price. Consequently, we need to pay attention to the consumption characteristics of this group and plan product categories and prices according to those characteristics

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