



# **A Study on the Impact of Virtual Community Characteristic on the Willingness of Chinese Gamers to Participate in Value Co-Creation**

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**Yanzhi Zhang**

**Supervisor: James Sallis**

## **Abstract**

Value co-creation is a popular marketing research topic in recent years, and there were already some studies regarding raising consumers' involvement in co-creation. However, virtual communities such as online games have seldom been addressed in this topic. This thesis aimed to shed light on mobile gamers' co-creation from the perspective of the characteristics of the virtual community. Hence, this study applied the theory of value co-creation and the characteristics of virtual communities to propose a research model.

After analyzing 167 valid online questionnaire respondents from game players, the results indicated that Incentive Mechanism, Members' Communication, Norm of Reciprocity had significantly positive effects on players' involvement in co-creation. In addition, the finding's practical implication suggested that the game companies need to provide unique services so that consumers could voluntarily and actively participate in value co-creation activities.

**Key words:** virtual communities, value co-creation, mobile social games, player communities

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# 1. Introduction

Based on the research report of NEWZOO (2018), the year of 2017 is a landmark for the game industry. The revenue of global games market has exceeded \$100 billion, to a total of \$109 billion, which has a remarkable growth of 56% in the past five years. This rapid growth reflects that games are rapidly becoming the world's favorite pastime, especially for the millennial generation. There are several kinds of platform in the game industry, such as PC Games, video games, webpage games, mobile games, etc. Of all the platforms, the revenue of mobile games segment is growing at the fastest rate, which is by 22% compared with the year 2016 (Newzoo, 2018). Meanwhile, mobile games continue to account for the largest share, increasing to 42%. Newzoo (2018) also forecasts that mobile games will remain the largest segment, with an increasing rate of 13.9% to claim 50% of the market by 2020.

By region, according to Newzoo's report, the actual sales revenues of the Chinese game market reached approximately 27.53 billion US dollars in 2017 and increased by 9.2% compared with the previous year. China accounts for more than 50% of the market share in Asia-Pacific and 25% of global. In addition to this, China has the largest number of game players in the world, with a population of 1.4 billion. China has remained in the leading position of game market since 2015. Therefore, this thesis will focus on the Chinese mobile game market.

Depending on how the game is played, the game can be divided into single-player games and online games. A single-player video game is usually designed as a game where there is input and operation from only one player (Oosterhu, Feireiss and Lukas, 2006). However, online game refers to the game where multiple people participate at the same time through Internet

connection (Rollings, Adams, 2006). Single-player game could not connect Internet for update, so the game producer could not change the content of the game after sales. It can only take advantage of users' opinions through online forum or any other communication method, and update in the next game version. But for online games, the Internet can lead to online interaction, and users could participate in various virtual communities. Today, games have reached mainstream and new gamer target groups will further evolve, which will pave the way for even newer gaming developments (Fabricatore et al., 2002). Currently, games do not mean simple games on screens or portable devices. As the development of science and technology, the boundaries of game definition became blurred (Wolf, 2008). Consequently, by proposing potential benefits to the gamer, video game developer provides the foundation for value creation in an exchange process (Fullerton, 2008).

In the past, consumers did not participate in the process of value creation, and were seen outside the corporate domain. Now, the new service logic indicates that services and relationships play an important role (Vargo, Maglio and Akaka, 2008). Companies act as service providers by proposing a potential value, whereas customers create the actual value in the co-creation process collaborating with companies (Prahalad and Ramaswamy, 2004; Vargo, Maglio and Akaka, 2008). Allowing customers to co-create with companies during interaction provide the companies an opportunity to gain a competitive advantage. Thus, marketers need to be aware that customers increasingly participate in value creation by value creation process (Grönroos, 2011; Prahalad and Ramaswamy, 2004). Especially for the game industry, it entails a unique set of requirements and provides an open innovation-friendly environment, which makes this

industry suitable for a wide range of co-creation options in the value creation process (Aoyama and Izushi, 2008). Prahalad and Ramaswamy (2004) also emphasize the importance of co-creation in the video game industry by arguing that video games could not exist without active co-creation with customers.

## **Research Purpose**

The purpose of this research is to explore the reasons why players willing to participate in the company's value co-creation, though it seems to be of no direct benefit to the gamer. I start with the characteristics of virtual communities and then study the influence of virtual community characteristics in Chinese players' willingness to participate in value co-creation.

## **Research Question**

*What kinds of Virtual Community Characteristics will affect the Willingness of Chinese Gamers to Participant in Value Co-Creation?*

## **Contribution**

At present, some researchers have already studied the value co-creation in the western game industry such as PC games and single-player games. However, most of the articles focused on new product development stages, such as how players help game companies test games. There is very little research on stages of game post go-live. In addition, there are not many studies on mobile online games, especially the Chinese market, which is the biggest market in the world. This thesis aims to shed light on Chinese mobile social games' co-creation from the perspective

of the characteristics of the virtual community.



## **2. Background**

*This chapter mainly introduces the definition and categories of mobile social games and virtual communities. Firstly, the definition of mobile social games is introduced. Secondly, the definition and related studies of virtual community is described. Thirdly, the types of virtual communities in the game industry is classified based on previous study. Lastly, player communities are subdivided into four types.*

### **2.1 Mobile Social Game**

A mobile game is a video game played on a mobile device. With the development of technology, such as touch screen, higher-quality software and hardware and fast-speed network, games developers focus on more interactions between players. Thus, mobile social games become more and more popular in the world (Wei and Lu, 2014). Mobile social game can be defined as a kind of mobile game that is played through online social networks. Players can play games with other players in their social networks or with strangers. Social interaction is a key factor that help drive game adoption and player retention (Fields and Cotton ,2012).

Unlike mobile offline game, mobile social games emphasize sharing and interaction with others. The cost of online user-to-user interaction is far less than offline, so users in online user innovation communities can share their innovation-conducive knowledge more efficiently than offline (Jeppesen and Frederiksen, 2006). Mandryk (2006) concluded that playing against other people can lead to more excitement, experienced fun, and less boredom. Thus, one of the most

important factors of mobile social games is that it creates a virtual community that facilitates players' interaction, communication and sharing with others (Wei and Lu, 2014).

## **2.2 Virtual Community**

### **2.2.1 Definition of Virtual Community**

The definition of a virtual community was introduced by Rheingold (1993), which is “a social network of individuals who interact through specific media, potentially crossing geographical and political boundaries in order to pursue mutual interests or goals”. Carver argues that a virtual community is a group of people gathering together because the Internet provides the space for interaction and sharing. Sometimes this kind of interaction is short, but it can also form the interpersonal atmosphere of trusting and sharing just like real society (Carver 1999). Some researchers treat the virtual community as an online social network, those who have common interests, goals or practical experience can share knowledge and engaged in social interactions (Roca, 2006).

The development of internet accelerated the expanding of virtual communities in new forms, such as social software, online forums and games (Hagel and Armstrong, 1997). These new forms include a series of software systems which facilitate users' communication and interaction. In these kinds of software or systems, members define the missions and governance by themselves, and membership is always voluntary and reputation is based on mutual trust

(Allen,2004).

The users' role in the virtual community becomes more and more important. Especially in the game industry, players generate many game-related contents by themselves. Now gamers have ability to develop or extend product in some area, they become a vital resource for the virtual community and game company.

### **2.2.2 Types of virtual communities of users in the game industry**

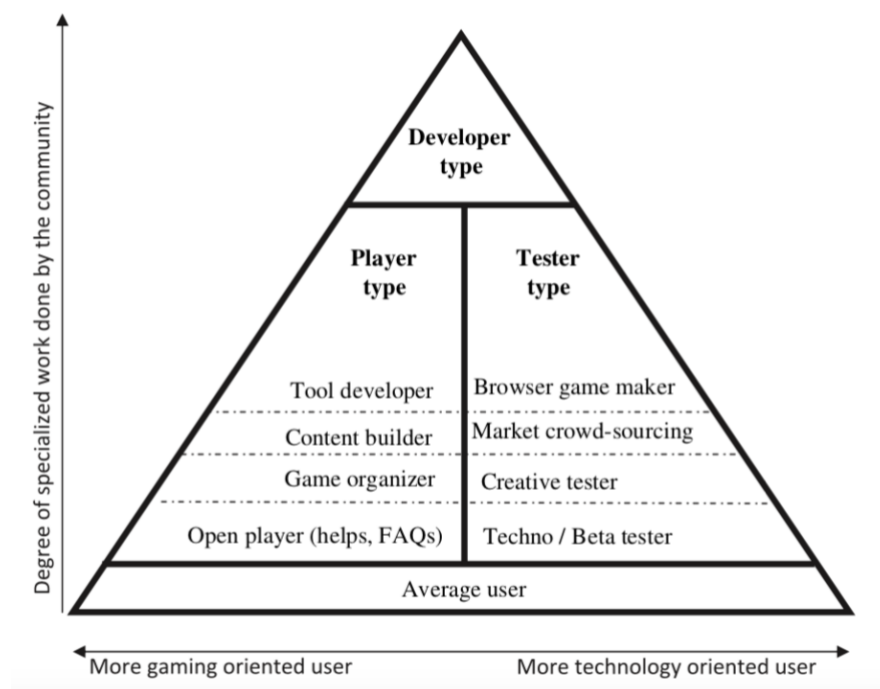
There are different angles to classify various types of virtual community, for example, based on four basic needs of human-beings, Hagel III and Armstrong (1997) classifies interaction of the community into: interests, relationships, fantasy and transactions. This kind of classification considers the role of the users in virtual community, but it need to be more specific in the game industry.

Thierry and Patrick (2011) introduced a new classification of virtual community in the game industry. They selected two dimensions, which are the orientation of the community and the degree of specialized work done by the community, to differentiate the gamers' virtual communities (Figure1):

The horizontal dimension means the *orientation of the community*. A gamer may be attracted by a game or community either for technological or gaming-orientated activities. This dimension indicates the link between the expectation of users and the resources provided by company.

The vertical dimension indicates the *degree of specialization of the work done by the community*.

The lower the community in the pyramid, the larger the community and less specialized the work it does. For example, on the bottom of the pyramid, the game is developed totally by the firm itself without any information from the communities. Most PC games in the early phase of games adopt this method because of the limitation of technology. However, in recent decades, firms seek more benefit from the knowledge of the users and even co-develop the games with the communities.



**Figure 1 Types of Virtual Communities in Game Industry (Thierry and Patrick, 2011)**

This figure divides the game users into four categories:

**(1) Average user Players:**

This kind of gamer is in the bottom of the pyramid, which only focuses to have fun of the game

by themselves without interacting with others. They may have brand loyalty to the game but bring no competencies for the firm.

## **(2) Developer Type Communities:**

Developer type communities are users with computer skills who can make programs or record portions of the product and exchange their creations with others regularly (Thierry and Patrick, 2011). Indeed, companies and communities through combined work and co-development to obtain new products. This kind of community can be seen in some console game such as Half-Life, however, for online social game, because of the balance of the game rule, it is seldom used in this mode of cooperation with gamers.

## **(3) Tester Type Communities:**

The right-hand column reflects the users of test type communities, whose main activity are to test the game during new product development. The purpose of the firm is to find bugs or errors of the game with the help of these users. The gamers will give feedback based on the result of testing.

## **(4) Player Type Communities:**

The left-hand column means player type communities, they use specific knowledge to create extended content, enhance game experience or help the game community work better. These kinds of knowledge sharing or creation can be within or out of the game itself. For example, some players create comic books regarding the game itself, which is beyond the game and also bring value to the whole community of the game.

### **2.2.3 Player type communities in mobile social game**

As mentioned above, there are three kinds of game communities: developer, tester and player. In recent years, researchers have done some research on these game communities. For example, the developer community can make the modified game be even more popular than its original game version (Mikael, Oscar and David, 2011). Min-Ting (2011) investigated the internal and external motivators of online game testers. However, the researches of player communities are very limited. Most of the researches focus on game itself, but they neglect the research on the whole game ecosystem, which means not only the game but also its derived product, such as animation, video, etc.

Most mobile social games are MMOG (Massively Multiplayer Online Games), which help form and grow user communities by facilitating interactions among game players. Cole and Griffiths (2007) found that these kinds of players are “highly socially interactive environments providing the opportunity to create strong friendships and emotional relationships.” Since interactions and communication are the most important factors of mobile social games, this thesis will only focus on player communities, which is highly relied on interpersonal relation.

Based on the previous research, there are various forms of player communities as below (Table 1):

**Table 1: Player type communities in the game industry**

| <b>Player Type Communities</b> | <b>Output/examples</b>   |
|--------------------------------|--|
| Open player                    | Produces help to a specific game on blogs, website, FAQs for other players that encounter difficulties to win in a game. The average users read those help tools when he is offline of the game, or watch videos demonstrating what to do. |
| Game organizer                 | Produces help directly in the game to the other players. Such kinds of player are commonly found in MMORPG and other online games where players interact. Typical examples are the so-called guild master.                                 |
| Content builder                | Produces additional content for a game. For example, comic books, animation, movie, etc.   |
| Tool developer                 | Produces tools to assist players, such as strategy of a game   |

Take the world's top mobile social game in 2017 "glory of the king" as an example, its annual revenue is more than 30 billion Yuan (around 4.7 billion US dollar) in 2017. But around the game, there is a plenty of related virtual communities, such as e-sports, game live show, comics, online movies, etc. In addition to the unofficial platform, game companies also built official platforms to guide and operate these virtual communities. In the year of 2017, Tencent, the company of "glory of king", create "Tencent Game player creation League (TGL)", which is the largest domestic game open platform. It covers all Tencent game IP (Intellectual Property) and connects all media channels. To support the game content creators, Tencent provides different kind of whole industry chain resources, such as hardware, commercialization, capital, etc.

### **3. Literature Review**

*In this Chapter, a literature review was conducted. Firstly, it briefly introduces five characteristics of virtual community. Secondly, it presents the concept of value co-creation. Thirdly, it shows what is the antecedent factors of value co-creation in virtual community. Based on the discussion, the research model is finally proposed.*

#### **3.1 Characteristics of the virtual community**

From the classification above, I can see that members of the virtual community interact with other members through the community, and then formulate different pattern of virtual communities accordingly. Roberts (1997) mentioned that virtual community contains five factors: Cohesion, Effectiveness, Help, Relationship, and Self-regulation. Some other researchers point out that this kind of community usually has three key characteristics. The first is group consciousness, which is the most important identity of the community, refers to the members of the community separate and differentiate the member within and outside of the community autonomously. The second is the sharing consciousness, which refers to the channels and tools for community members to maintain, strengthen and expand community's culture, values, codes of conduct, identity, symbols, group consciousness, etc. within and outside the community. The third is moral responsibility, which is embodied in the support attitude of retaining the old members, recruiting the new members and enjoyment of brand consumption experience (Muniz A M, 2001; Capece, 2013). Bagozzi and Dholakia (2002) studies the reasons for the establishment of virtual communities, and find out that common



interests, communication among community members, and community norms are the basic characteristics of virtual communities. Jang (2008) also proposed four basic characteristics of virtual brand communities, including information quality, system quality, interaction and reward.

Based on the existing research of virtual community characteristics, this thesis will divide the characteristics of virtual community into five aspects: Quality of Interface, Incentive mechanism, Integration of community, Members' Interaction and Reciprocal norm.

### **(1) Quality of Interface**

Interface quality refers to the community members' evaluation of the interface elements and the interactive experience of people and interfaces, this evaluation generally from functionality and usability. The interface quality mainly includes the information quality and system quality (Jang et al., 2008). For online games, it refers to the design of UI, playing method and the information provided by the games.

### **(2) Incentive Mechanism**

Incentive Mechanism refers to the incentives that virtual communities provide to members in order to increase the activity of community members and the viscosity of the community (Zhang and Li, 2017). These incentives can stimulate the enthusiasm of community members to participate in activities.

### **(3) Integration of Community**

Integration of community mainly refers to the psychological feelings of members, such as group consciousness, community spirit and responsibility, which is a fundamental nature of the community (Mcalexander, 2003).

### **(4) Members' Interaction**

Members' interaction means that the mutual communication between community members based on common brand interests and brand experience (Jang et al., 2008).

### **(5) Norm of Reciprocity**

Reciprocal norm is in terms of social norms, which refers to a member of the community have the feeling that others in community will also help he/she at some time in the future, so he/she willing to when others who need help (Kankanhalli,2005). This behavior formulates the necessary norms and constraints of virtual community.

As shown in the literatures above, virtual community is the accumulation of a network society, many people from different areas can discuss common interests through the Internet, or build relationships and contacts. Playing online games equal to participation in virtual community, each user plays a role of virtual game, interact with other people actively to establish friendly relations and maybe talk about the more outside of the game. In the virtual community, members share information with each other, and participate in a variety of different theme community. In addition to satisfying their own interests, they can share different experience with other users. These characteristics of virtual communities can also apply to online games.

This study focuses on the part of mobile online games where users are more likely to participate in game-related social networking, in addition to interacting with other users who share the same interests.

### **3.2 Consumer value co-creation**

In the traditional value creation process, enterprises and consumers play the roles of production and consumption (Prahalad and Ramaswamy, 2004). Products and services contain value. Markets are places where exchange values are exchanged, from producers to consumers. The process of value creation occurs outside the market. However, when I turn to value co-creation, the boundary between producer and consumer disappears. Consumers are engaged in the process of defining value and creating value more and more, and creating experience becomes the real foundation of value. The center of value creation is transferred from the company to the consumer experience. Value is created by companies and consumers together, and the interaction between them is the key point. Prahalad and Ramaswamy (2004) define "problems" and solve "problems" together. The basis of value creating is consumers' experience, the interaction between the customer and company become the focus of value creation. Value co-creation is the process of creating experience through dialogues between companies and consumers, and innovative experience environment is the source of enterprises' value and competitive advantages. In the perspective of service dominant logic, value is no longer defined as value exchange, it is value-in-use for consumer. Value exchange is controlled by company and is transferred from producer to customer, but the value-in-use is derived from the user's process and situation. Consumers are no longer be treated as an operand resource, but an operant

resource. Operand resources tend to be static in nature and are typically physical, for example raw materials or physical products. Nevertheless, operant resources are dynamic and can be rejuvenated and replenished. They are typically human organizational, informational and relational, such as skills and knowledge possessed by consumers (Edvardsson et al., 2011). Therefore, consumers are the co-creators of value (Vargo and Lusch, 2004). Further, Gronroos (2006) argues that in the value co-creation, consumer is in dominant position of value co-creation, however enterprise is supporters of value co-creation. Burger-Helmchen and Cohendet (2011) point out that a significant part of the value in the game industry is created by the communities, which in turn are not directly controlled by the company.

### **3.2.1 Value co-creation in virtual community**

The development of the Internet has changed the environment of traditional value creation. On the Internet, virtual community became important value creation platform (Astyne, 2016). It became an active value co-creation platform, generated a new interaction way, affected the brand deeply and the relationship between consumers and companies (Hudson, 2016). In the Internet, virtual community makes consumers have more rights to speak, consumers have more authorization to strengthen the behavior of co-creation (Kull and Heath, 2016). It changed the co-creation roles and relationships, consumers are changed from "hunters" (Prahalad and Ramaswamy, 2004) to "filter" (Sindhav, 2011), which means that users have more rights in the process of value co-creation.

### **3.3 Antecedent Factors of Co-Creation in virtual community**

As mentioned above, gamers participate in co-creation with game companies in different kind of situations. To find out the antecedent factors which influence players' involvement in co-creation is valuable for game company, since these will help them get more benefits from co-creation in product development phases and establish better co-creation environment for gamers. Since online social games are one kind of virtual community, I will analysis these antecedent factors of co-creation based on the characteristics of virtual community: Quality of Interface, Incentive mechanism, Integration of community, Members' Interaction and Norm of Reciprocity.

#### **3.3.1 Relationship between Quality of Interface and Co-creation**

The interaction of game players is a dynamic form of communication, including video, voice and software programs. Therefore, games should be enhanced and optimized in all aspects, and the game interface is the most intuitive aspect of the communication (Zhang and Li, 2017). A high-quality game interface can make the communication between players more smooth and convenient, which is an important premise for players to participate in value co-creation.

Some researcher indicates that the information and system quality of virtual communities will positively affect the satisfaction and loyalty of the virtual community (Anderson and Srinivasan,2003). And a high satisfaction of community will lead to customers' high involvement of co-creation. Fournier (1998) confirmed the high levels of brand relationship will have positive impact of consumer behavior, including repeat purchase intention, consumers'

recommendation, tolerance of brand's mistake and behavior of value co-create. Bock (2005) found that high-quality interface of virtual communities has positive influence for its members' high perceived in ease of use and usefulness, meanwhile it can enhance members' willingness of using the interface, and further enhance the affinity and trust to the operator and other community members.

Based on the argument above, the quality of interface in virtual community will influence the consumers' involvement of value co-creation. Hence, the following hypothesis:

**H1: The interface quality of the virtual community has a positive effect on consumer involvement in co-creation.**

### **3.3.2 Relationship between incentive mechanism and Co-creation**

Incentive mechanism means to enhance activity and participation of virtual community members, some economic rewards (Scores, discount, etc.) or symbolic rewards (upgrade of membership, improvement of authority, etc.) are given to the members. These incentives could stimulate the enthusiasm of community members' participation, bring material and spiritual benefits for members, thus improve their satisfaction and trust of the community. Hernandez (2002) pointed out that the good incentive mechanism of the virtual community could improve the satisfaction of community members. Sheth (1995) concluded that giving reward for the members who provide valuable information could improve the level of community co-creation.

Based on the analysis above, this thesis proposes the following hypothesis:

**H2: The incentive mechanism in the virtual community has a positive effect on consumer involvement in co-creation.**

### **3.3.3 Relationship between Integration of community and Co-creation**

Integration of community mainly refers to the psychological feelings of its members, such as group awareness, community spirit, and responsibilities (Zhang and Li, 2017). It is a continuous process, from joining the virtual community, then deepening understanding of community through the interactions between members, to finally blending in the community (Carlson, 2008). When community members identify with the community and other members, the sense of satisfaction and trust in the community rises. Porter and Donthu (2008) pointed out that integration of community is an important factor influencing trust of community members. Therefore, when community members identify with the community and others, they are more willing to co-creation for the community. So the following hypothesis is proposed:

**H3: The Integration of the virtual community has a positive effect on consumer involvement in co-creation.**

### **3.3.4 Relationship between Members' Interaction and Co-creation**

Members' interaction refers to the information and experience exchange, which based on common hobbies among community members (Zhang and Li, 2017). Virtual brand community is essentially a continuous interactive social network, and most information and emotion connection between users and brand is in the form of interaction between members. Because of

some motivations, consumers join the virtual community, communicate topic with the other members, so interaction become a vital method for value acquisition and co-creating in the community (Nambisan and Baron, 2007). Rovai (2002) also believes that the interaction of members is an important factor in enhancing trust and ultimately promoting the sense of belonging. Shang (2006) thinks that the more interaction between community members, the deeper understanding the excellent quality of members and value in the community. The community's satisfaction and trust will be stronger, thus increase the level of value co-creation.

The research above shows that interaction among community members can affect the members' co-creation in virtual community. Therefore, this study proposes the following hypothesis:

**H4: The Members' Interaction of the virtual community has a positive effect on consumer involvement in co-creation.**

### **3.3.5 Relationship between Norm of Reciprocity and Co-creation**

In a good reciprocal norm community, members trust each other equally, they believe that they can be rewarded in the future if they help others in value co-creation activities such as knowledge sharing. Because of this kind of belief, they can be more involved in value co-creation activities and help each other (Hsu, 2007). In a virtual community, if participants get mutual benefit in the process of knowledge exchange, they will satisfy with the value co-creation in the virtual community, hence it will build trust between each other and the platform of the virtual communities, and this kind of good relationship will eventually lead to mutual value co-creation such as knowledge sharing (Casaló and Flavián, 2010).

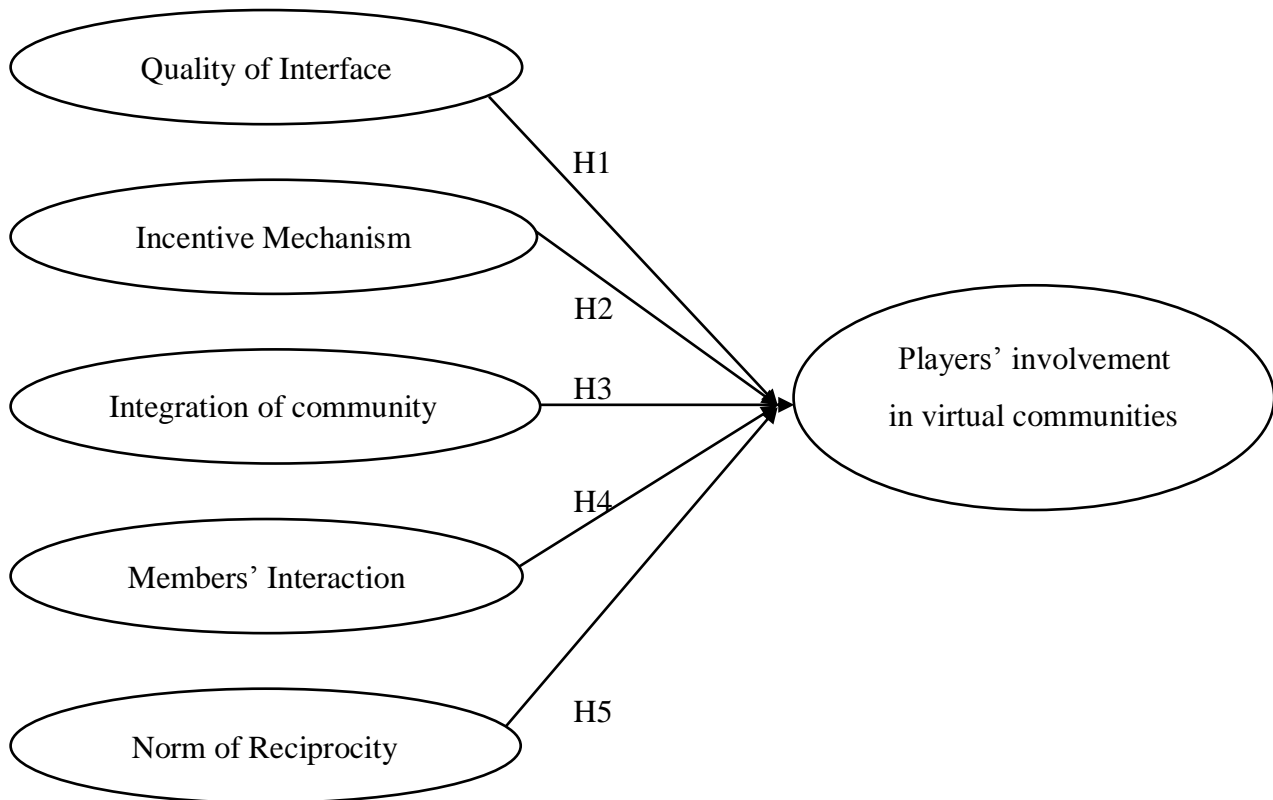


According to the argument, I have the hypothesis below:

**H5: The Norm of Reciprocity of a virtual community has a positive effect on consumer involvement in co-creation.**

### 3.4 Research Framework

**Figure 2: Research Model**



## **4. Methodology**

*This chapter outlines the research method. It includes research design, sample and data collection, measurement, and questionnaire.*

### **4.1 Overview of Research Design**

The purpose of this study is to identify and test which virtual communities' characteristics (Quality of Interface, Incentive mechanism, Integration of community, Member Interaction and Reciprocal norm) can motivate players co-create with game companies.

Quantitative research refers to the counting and measurement of things, the scope and distribution of the subject matter (Berg and Lune, 2017) . Questionnaire is an efficient way to collect large sample data in quantitative methods. Based on the factors summarized in the previous literature, this thesis used questionnaire to collect data to which virtual communities' characteristics will affect Chinese mobile game players' willingness to co-create with game companies.

### **4.2 Sampling**

This survey was collected through a Chinese web/mobile phone questionnaire platform called "WJX.cn". After finishing editing the survey, I sent the draft questionnaire to three of my friends for a pre-test in order to make sure that the statement in this questionnaire is clear and reasonable. After slightly adjustment of this survey, I send this survey to my friends and several

mobile players Wechat group. In the first section of this questionnaire, respondents were identified playing mobile social game experience or not. Then, respondents who had mobile social game experiences were requested to answer the rest of questions.

### 4.3 Measurements

The first part of the questionnaire is regarding interviewees' personal information, such as gender, age, education, job, income, spending on the game, game experience, etc. (see Appendix 1). The age group, spending on the game and game experience is based on previous statistic data, so I can ensure that the sample covers the real population of players.

The second part of the questionnaire includes 23 measurement items to measure 5 independent factors and one dependent factor (Quality of Interface, Incentive mechanism, Integration of community, Members Interaction, Reciprocal norm and Willingness of Co-creation). All of the items were adapted from previous literature review of virtual communities but adjusted to fit into the context of mobile social games. All sections were conducted by seven-point Likert scales. Then, the following part will discuss about operational definition and each scale of key variables in our questionnaire.

***Quality of Interface*** The five items were adapted from Zeithaml et al. (1996) and Jang H et al. (2008). This evaluation from the functionality and usability of the game.

---

QOI1 The design of the game mode is interesting

QOI2 This game fix bug very timely

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|                                     |      |   |
|-------------------------------------|------|---|
| Quality of<br>Interface<br>(Q9~Q13) | QOI3 | The content of this game related content (such as game videos, strategies, game live, etc.) is very informative |
|                                     | QOI4 | This gameplay design is fair  |
|                                     | QOI5 | This game is easy for beginners   |

---

***Incentive Mechanism*** These three items were taken from Sheth (1995) and Jang H et al. (2008).

These items focus on timeliness and fairness of the incentive mechanism.

---

|                                     |     |   |
|-------------------------------------|-----|---|
| Incentive<br>Mechanism<br>(Q14~Q16) | IM1 | This game rewards active players with virtual goods (such as daily coins, game equipment, etc.)   |
|                                     | IM2 | This game has a psychological reward for active players such as game title, game honor, rating, etc.                                      |
|                                     | IM3 | This game rewards players for sharing game content (such as game records, game titles, etc.) on social platforms (such as WeChat, Weibo). |

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***Integration of Community*** The five items were based on Mcalexander (2003). These items assessed the psychological feeling of members, such as group consciousness, community spirit, etc.

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|   |      |   |
|---|------|---|
| Integration<br>of<br>community<br>(Q21~Q25) | IOC1 | In the process of playing in a team with other players, I felt a sense of collective or closeness         |
|   | IOC2 | Compared to other games, I prefer the player community of this game                                       |
|   | IOC3 | If this game has a game union, I think it is beneficial to join a union in this game.                     |
|   | IOC4 | Compared to other games, I feel that the characteristics of this game player communities are more similar |
|   | IOC5 | In this game, it is not difficult to become familiar with other players                                   |

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**Members' Interaction** The four items were adapted from Jang H et al. (2008). These items measured the degree of information exchange among members and between members and game company.

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|                                   |     |   |
|-----------------------------------|-----|---|
|                                   | MI1 | In this game, players exchange frequently (such as chat, equipment trading, etc.)             |
| Members' Interaction<br>(Q17~Q20) | MI2 | If I send a game team request, time for waiting others to join the team is usually very short |
|                                   | MI3 | Outside the game, I still have contact with some game players                                 |
|                                   | MI4 | The game company often have some online or offline interactive activities with players        |

---

**Norm of Reciprocity** These three items were taken from Kankanhalli (2005). These items were used to measure the level of trust among communities' members.

---

|                                  |      |   |
|----------------------------------|------|---|
|                                  | NOR1 | When helping others or sharing experiences in the game, I think I also have gained some experience in this process                          |
| Norm of Reciprocity<br>(Q26~Q28) | NOR2 | I think other players in the game will help me, so it's fair and reasonable for me to help others.  |
|                                  | NOR3 | When sharing ideas or solving others' problems in games or in related communities, I believe that I can get more responses when I need them |

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**Willingness of Co-creation** The four items were based on Li Chaohui (2013), measuring willingness of players to participate in the co-creation process of the game.

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|   |       |   |
|---|-------|---|
|   | WILL1 | I am willing to participate in the creative process of new products or game content development initiated by game companies |
| Willingness of Co-creation<br>(Q29~Q32) | WILL2 | I would like to share my game experience or video with other players  |
|   | WILL3 | If I have ability, I am willing to give help or guidance to other players in the same game union or game team.              |
|   | WILL4 | If there are some DIY tools of game (such as self-designed game equipment, costumes, etc.), I would like to try             |

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### **4.3 Data Collection**

The questionnaire survey was sent to several mobile game Wechat group and author's friends. All of the surveys were done on mobile phone or computer since it is convenient and effective method to collect data. There is a question check, if the user choose that he/she never played online social games before, the questionnaire will be submitted and marked invalid.

To make sure that every Chinese player could understand the content of my questionnaire, I translated the questionnaire into Chinese. Before I released it, a small pilot-study was conducted. I found some friends who played mobile social games before to do the pre-test, then I got some advice of the survey. After modifying the questionnaire, all of statement could be understood well. The valid respondents were restricted to having the mobile game experiences.

### **4.4 Choice of Statistical Tests**

According to previous studies, I use SPSS version 22 to analyze the collected data. Firstly, the descriptive method of SPSS was used to show the distribution of demographic data. Secondly, the Reliability Analysis of SPSS was applied to test the reliability of each factor. Thirdly, the Factor Analysis of SPSS was also used to test construct validity of each item. Fourthly, in order to find significant factors, the Regression Analysis of SPSS was applied to test hypotheses between factors and players' Co-creation Willingness.

## **5. Result and Analysis of Quantitative Research**

*This part will show the result of quantitative study. Firstly, I will describe and analyze players characteristics. Second part will conduct factor analysis. Third part will do the reliability test to examine internal consistency reliability and finally do the regression analysis to test hypotheses.*

A total number of 251 responses were collected in five days from 11th May to 14th May, 2018. Finally, I got 251 responses totally but 77 of them had never played multiplayer online mobile games before. Besides that, seven of them filled in the same option for all answers, so these answers were excluded in this research. Therefore, finally 167 questionnaires were valid data for analysis.

### **5.1 Sample Profile**

The complete description of respondents' characteristics and players' habit are shown in Table 2. Each item will be analyzed as follows:

#### **Gender**

In the 167 valid questionnaires, 59% of them are male respondents and 41% are female respondents, male is slightly higher than female in this survey. This result is in line with a survey made by Endofesk in 2017, which indicated that male accounted for 57% and female accounted for 43% in China Mobile Games market from January to June in 2017. Hence, the

sample of this survey can effectively reflect the status of the entire mobile game player group, men are still the main users of mobile game market.

## **Age**

Most players who took this survey were mainly distributed the range from 19 to 29 years old, which occupied 66% of total respondents. These questionnaires cover all age ranges, 6% for age under 18, 14% for 30-34, 5% for 35-39, and 8% for over 40 years old. Based on the survey CINIC (China Internet Network Information Center) in 2016, the age ranges from 20 to 29 is the core user group of mobile phone users, accounting for 63% of the total players, which is quite similar to this sample. Therefore, it also can be seen that the age group in this survey can reflect the status of the entire players group.

## **Education**

From the education aspect, most of the respondents have bachelor degree with a number 55 %, 31% of the respondents have master degree, 8% is high school education or below, and 6% is college degree. The results indicate that 86% respondents have bachelor degree or above. However, according to a research report from Aurora Big Data in 2017, 55% players have a bachelor degree or above, 45% of them hold a degree below bachelor. The main reason may be that more data is collected from university students and office workers.

## **Frequency of playing mobile online games**

This survey indicated that more than half of the users play online mobile games at least one time per day, 20% of the respondents play multiple times a day and 33% of them play 1 or 2



times a day. Based on the survey from Aurora Big Data, the average times of usages per day for the game Glory of King was 2.33 in May 2017, which is are also basically consistent with this thesis survey.

**Table 2 Sample Profile (n=167)**

| <b>Measure</b>    | <b>Items</b>                 | <b>Number</b> | <b>Percentage</b> |
|-------------------|------------------------------|---------------|-------------------|
| <b>Gender</b>     | <b>Male</b>                  | 99            | 59%               |
|                   | <b>Female</b>                | 68            | 41%               |
| <b>Age</b>        | <b>Under 18</b>              | 10            | 6%                |
|                   | <b>19~25</b>                 | 61            | 37%               |
|                   | <b>26~29</b>                 | 50            | 30%               |
|                   | <b>30~34</b>                 | 24            | 14%               |
|                   | <b>35~39</b>                 | 8             | 5%                |
|                   | <b>Over 40</b>               | 15            | 8%                |
| <b>Occupation</b> | <b>Students</b>              | 66            | 40%               |
|                   | <b>Full-time Job</b>         | 95            | 57%               |
|                   | <b>Freelance</b>             | 4             | 2%                |
|                   | <b>Others</b>                | 2             | 1%                |
| <b>Education</b>  | <b>High school or below</b>  | 13            | 8%                |
|                   | <b>College</b>               | 10            | 6%                |
|                   | <b>Bachelor</b>              | 92            | 55%               |
|                   | <b>Master and above</b>      | 52            | 31%               |
| <b>Frequency</b>  | <b>Multiple times a day</b>  | 34            | 20%               |
|                   | <b>1~2 times per day</b>     | 55            | 33%               |
|                   | <b>Once in a few days</b>    | 41            | 25%               |
|                   | <b>Once or less per week</b> | 37            | 22%               |

## 5.2 Factor Analysis

The purpose of factor analysis is to use a few factors to describe the relationship between multiple variables. The method of factor analysis is to classify the variables that are more closely related to the same category (Pallant,2016). Factor analysis assesses the construct validity of the five independent and one dependent latent variables. Do the questions representing each construct go together (convergent validity) and do the latent constructs stay separate (discriminant validity)?

Since there are 6 factors in our previous model, so I will choose Fixed number of 6 factors for factor analysis first. However, after first analysis, I can find that there exists difficulty with discriminates validity between factors MI (Members' Interaction) and IOC (Integration of Community). The statements of the two factors in questionnaire come from established theory, however, applied to online forum of virtual community. Possibly because of the different context of virtual community in my thesis, the respondents do not distinguish between the concepts for the purpose of this analysis.

Meanwhile, from theory part, Bagozzi and Dholakia (2002) found that communication among community members is one of the basic characteristics of virtual communities. Therefore, if I combine "Members' Interaction" and "Integration of Community" together into one variables "Members' Communication", this factor analysis will be more reasonable.

Besides that, I can see that most of the items' factor loading numbers are more than 0.45 except QOI5. Hence, according to the first data analyst, I exclude item QOI5 and use fixed number of 5 factors to check the result.

First step is to assess the factorability of the data with KMO (Kaiser-Meyer-Olkin) and Bartlett's test of sphericity measures. According to Pallant, the KMO value should be .6 or above and the Bartlett's Test of Sphericity should be .05 or smaller. In this example (See Table 3), the KMO value is .865 > .6 and Bartlett's test is .000 < .05, which means that data are suitable for factor analysis.

**Table 3:KMO and Bartlett's Test**

|  |                    |           |
|--|--------------------|-----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .865      |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 1,890,464 |
|  | df                 | 253       |
|  | Sig.               | .000      |

After that, in order to determine the factors number in Kaiser's criterion, the result in the Total Variance Explained table (see Table 4) should be checked. In this sample, only first five components' initial eigenvalues are above 1 (8.156,2.641,1.546,1.373,1.078). The cumulative value is 64.321%, which means the five components can explain a total of 64.321% of the variance.

**Table 4: Total Variance Explained**

| Factor | Initial Eigenvalues |               |              |
|--------|---------------------|---------------|--------------|
|        | Total               | % of Variance | Cumulative % |
| 1      | 8,156               | 35,461        | 35,461       |
| 2      | 2,641               | 11,483        | 46,944       |
| 3      | 1,546               | 6,720         | 53,664       |
| 4      | 1,373               | 5,969         | 59,634       |
| 5      | 1,078               | 4,687         | 64,321       |
| 6      | ,906                | 3,941         | 68,262       |

Total Variance Explained (Table 5) can also be used to determine the number of factors to retain (Pallant,2016). It can be seen that most of the items' factor loading numbers are more than 0.45 except QOI5. So based on the result of Total Variance Explained, QOI5 should be eliminated.

**Table 5: Total Variance Explained**

| Rotated Factor Matrix <sup>a</sup> |        |      |      |      |      |
|------------------------------------|--------|------|------|------|------|
|                                    | Factor |      |      |      |      |
|                                    | 1      | 2    | 3    | 4    | 5    |
| QOI1                               |        |      | ,632 |      |      |
| QOI2                               |        |      | ,672 |      |      |
| QOI3                               |        |      | ,604 |      |      |
| QOI4                               |        |      | ,680 |      |      |
| IM1                                |        |      |      | ,770 |      |
| IM2                                |        |      |      | ,657 |      |
| IM3                                |        |      |      | ,689 |      |
| MI1                                | ,502   |      |      |      |      |
| MI2                                | ,519   |      |      |      |      |
| MI3                                | ,628   |      |      |      |      |
| MI4                                | ,572   |      |      |      |      |
| IOC1                               | ,648   |      |      |      |      |
| IOC2                               | ,744   |      |      |      |      |
| IOC3                               | ,486   |      |      |      |      |
| IOC4                               | ,616   |      |      |      |      |
| IOC5                               | ,571   |      |      |      |      |
| NOR1                               |        | ,726 |      |      |      |
| NOR2                               |        | ,641 |      |      |      |
| NOR3                               |        | ,664 |      |      |      |
| WILL1                              |        |      |      |      |      |
| WILL2                              |        |      |      |      | ,569 |
| WILL3                              |        |      |      |      | ,678 |
| WILL4                              |        |      |      |      | ,516 |

### 5.3 Reliability Analyst

Reliability can assess the internal consistency of the measurement items. Internal consistency measures one same underlying attribute from different degrees (Pallant,2016). To test reliability, Cronbach's Alpha is one of the most accepted methods. Cronbach's coefficient alpha value is from 0 to 1. In general, the cutoff to accept that a measure is reliable is 0.7 (Nunnally, 1978). Corrected Item-Total Correlation value means "an indication of the degree to which each item correlates with the total score" (Pallant,2016). The value should above 0.3, which means all the items correlate with the total score well. The "Cronbach's Alpha if Item Deleted" value is to check if one of the items is deleted, is there any possible improvement of Cronbach's Alpha.

Table 6 demonstrates the result of Reliability Test. It can be seen that all the items' Corrected Item-Total Correlation are above 0.3 and all Cronbach's Alpha value is more than 0.7, which means the Internal Consistency is acceptable.

**Table 6: The Result of Reliability Test**

| Factors                           | Items | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted | Cronbach's Alpha |
|-----------------------------------|-------|----------------------------------|----------------------------------|------------------|
| <b>Quality of Interface (QOI)</b> | QOI1  | ,624                             | ,745                             | ,799             |
|                                   | QOI2  | ,624                             | ,742                             |                  |
|                                   | QOI3  | ,600                             | ,754                             |                  |
|                                   | QOI4  | ,604                             | ,754                             |                  |
| <b>Incentive Mechanism (IM)</b>   | IM1   | ,699                             | ,701                             | ,811             |
|                                   | IM2   | ,667                             | ,740                             |                  |
|                                   | IM3   | ,627                             | ,783                             |                  |
| <b>Members'</b>                   | MI1   | ,529                             | ,856                             | ,864             |

|  |       |      |      |      |
|--|-------|------|------|------|
| <b>Communication</b><br><b>(MC)</b>                          | MI2   | ,578 | ,851 |      |
|  | MI3   | ,568 | ,854 |      |
|  | MI4   | ,554 | ,853 |      |
|  | IOC1  | ,634 | ,846 |      |
|  | IOC2  | ,706 | ,838 |      |
|  | IOC3  | ,562 | ,852 |      |
|  | IOC4  | ,647 | ,845 |      |
|  | IOC5  | ,584 | ,850 |      |
| <b>Norm of Reciprocity</b><br><b>(NOR)</b>                   | NOR1  | ,753 | ,685 | ,826 |
|  | NOR2  | ,602 | ,836 |      |
|  | NOR3  | ,696 | ,746 |      |
| <b>Willingness of</b><br><b>Co-creation</b><br><b>(WILL)</b> | WILL1 | ,582 | ,740 | ,786 |
|  | WILL2 | ,625 | ,718 |      |
|  | WILL3 | ,655 | ,707 |      |
|  | WILL4 | ,522 | ,768 |      |

## 5.4 Hypotheses Testing

In order to know the relationships between Willingness of players' involvement in value co-creation and the four factors of virtual community, I will test the four hypotheses. First part is regarding correlation matrix, which goal is to see the significant between the factors above. Second part is regression, which figure out which factor is significant with Willingness of players' involvement in value co-creation and compare the magnitudes of the effect of each variable.

### 5.4.1 Correlation

Correlation analysis is for describing the strength and direction of the linear relationship between two variables (Pallant, 2016). The output results of correlations can be seen from Table 7.

**Table 7: The Result of Correlations Matrix**

| Correlations |                     | WILL   | QOI    | IM     | MC     | NOR    |
|--------------|---------------------|--------|--------|--------|--------|--------|
| WILL         | Pearson Correlation | 1      | ,404** | ,409** | ,618** | ,618** |
|              | Sig. (2-tailed)     |        | ,000   | ,000   | ,000   | ,000   |
|              | N                   | 167    | 167    | 167    | 167    | 167    |
| QOI          | Pearson Correlation | ,404** | 1      | ,531** | ,403** | ,420** |
|              | Sig. (2-tailed)     | ,000   |        | ,000   | ,000   | ,000   |
|              | N                   | 167    | 167    | 167    | 167    | 167    |
| IM           | Pearson Correlation | ,409** | ,531** | 1      | ,310** | ,335** |
|              | Sig. (2-tailed)     | ,000   | ,000   |        | ,000   | ,000   |
|              | N                   | 167    | 167    | 167    | 167    | 167    |
| MC           | Pearson Correlation | ,618** | ,403** | ,310** | 1      | ,573** |
|              | Sig. (2-tailed)     | ,000   | ,000   | ,000   |        | ,000   |
|              | N                   | 167    | 167    | 167    | 167    | 167    |
| NOR          | Pearson Correlation | ,618** | ,420** | ,335** | ,573** | 1      |
|              | Sig. (2-tailed)     | ,000   | ,000   | ,000   | ,000   |        |
|              | N                   | 167    | 167    | 167    | 167    | 167    |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

In this sample, I can see all of the Person correlation coefficient are positive, indicating a positive correlation between these two factors. For example, the more Members' Communication (MC) the virtual community have, the more willingness to involve in value co-creation (WILL) players have. Since the correlation coefficients of each variable are below 0.7, so there are not very strong related and no risk of multicollinearity (Pallant, 2016). All of the significance level (listed as Sig. 2 tailed) are less than 0.01, which means all the factor items

are significant.

## 5.4.2 Regression

Firstly, I will check the R Square value in Model Summary (Table 8). This means how much of the variance in the dependent variable is explained by the model (Pallant, 2016). In this sample, the value is .513, which illustrates that 51.3% of the variance in Willingness of Players' Involvement in Co-creation can be explained by our model.

**Table 8: The Result of Model Summary**

**Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .717 <sup>a</sup> | .513     | .501              | .81821                     |

a. Predictors: (Constant), NOR, IM, MC, QOI

b. Dependent Variable: WILL

To assess the statistical significance of the result, I need to check the ANOVA table (Table 9).

Since F-value is 42.728 (Sig.=.000),  $p < .001$ , so the model as a whole is significant.

**Table 9: The Result of ANOVA**

**ANOVA<sup>a</sup>**

| Model |            | Sum of Squares | df  | Mean Square | F      | Sig.              |
|-------|------------|----------------|-----|-------------|--------|-------------------|
| 1     | Regression | 114,419        | 4   | 28,605      | 42,728 | .000 <sup>b</sup> |
|       | Residual   | 108,453        | 162 | .669        |        |                   |
|       | Total      | 222,872        | 166 |             |        |                   |

a. Dependent Variable: WILL

b. Predictors: (Constant), NOR, IM, MC, QOI

To know which variables contributed to the prediction of the dependent variable, I need to look



in the Coefficients table (Table 10). The commonly used cut-off points for determining the presence of multicollinearity is: Tolerance value of less than 0.10, or VIF value is more than 10 (Pallant,2016). From the table below, I can see that all the tolerances are greater than 0.10 and VIT are less than 10. So there is no risk among these four independents.

**Table 10: The Result of Coefficients**

| Model        | Unstandardized |            | Standardized |  | t     | Sig. |
|--------------|----------------|------------|--------------|--|-------|------|
|              | Coefficients   |            | Coefficients |  |       |      |
|              | B              | Std. Error | Beta         |  |       |      |
| 1 (Constant) | ,289           | ,397       |              |  | ,728  | ,467 |
| QOI          | ,028           | ,075       | ,026         |  | ,377  | ,707 |
| IM           | ,163           | ,063       | ,168         |  | 2,566 | ,011 |
| MC           | ,382           | ,073       | ,357         |  | 5,203 | ,000 |
| NOR          | ,365           | ,073       | ,346         |  | 4,983 | ,000 |

Dependent Variable: WILL

At last, I will review all the hypotheses based on the test result. Hypothesis 1 is the interface quality of the virtual community has a positive effect on consumer involvement in co-creation. From the Table 11, The Beta of QOI is .028, but the Beta value is very close to 0, and the P-value of it is  $0.707 > 0.05$ , QOI is not sig. Even according to the one-side test, its P-value is  $0.707/2=0.354$ , it's still  $> 0.05$ , so Hypothesis 1 is not supported.

Hypothesis 2 is the Incentive Mechanism in the virtual community has a positive effect on consumer involvement in co-creation. From the Table 10, I can see the Beta of IM is 0.163, this shows there is a positive effect on Consumer's Co-creation Attitudes, the P-value of it is 0.011

$< 0.05$ , so Hypothesis 2 is supported.

Hypothesis 3 is the Integration of the virtual community has a positive effect on consumer involvement in co-creation. Hypothesis 4 is the Member Interaction of the virtual community has a positive effect on consumer involvement in co-creation. As we analysis before, these two factors are merged into one factor “Members Communication”. Hence the new Hypothesis 3a is “the Members Communication of the virtual community has a positive effect on consumer involvement in co-creation”. As we see, its Beta value is 0.382, and the P-value is  $0.000 < 0.05$ , so the TF has positive influences on consumer involvement in co-creation, and this means Hypothesis 3a is supported.

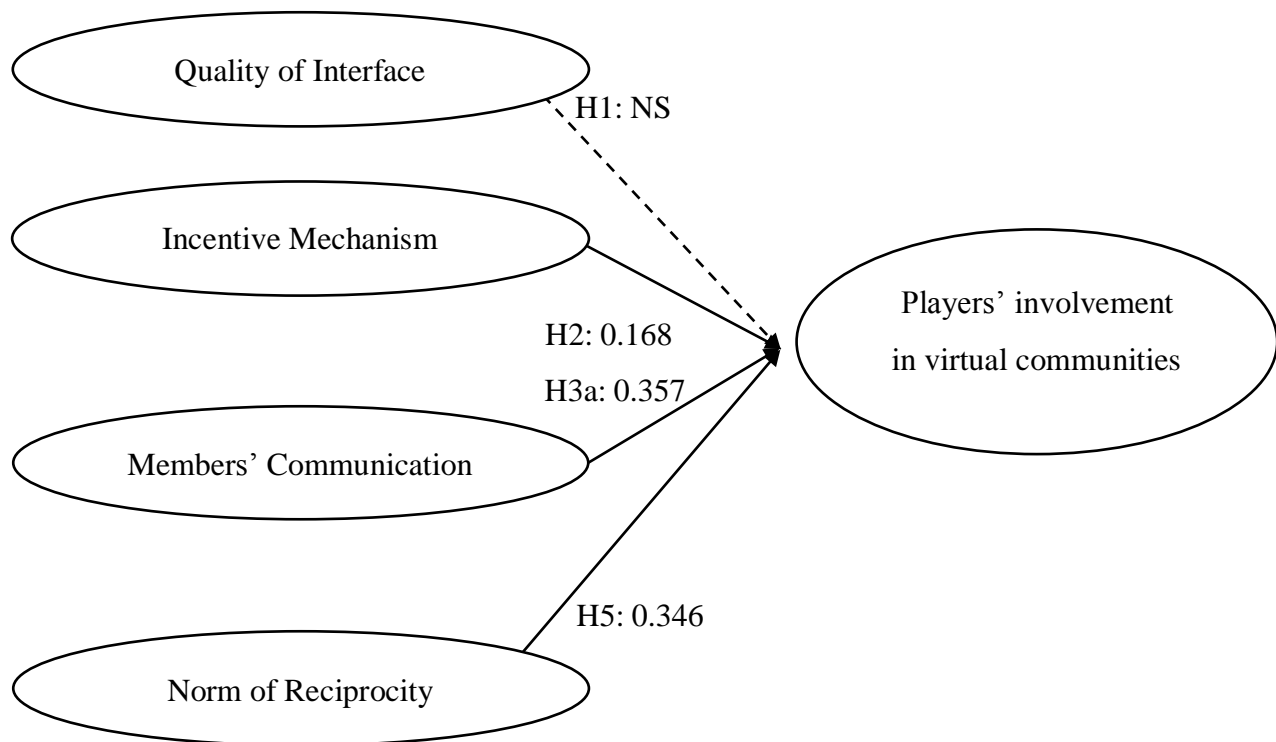
Hypothesis 5 is the Reciprocal norm of a virtual community has a positive effect on consumer involvement in co-creation. I can see the Beta value is 0.365, which means the Cultural factors have positive effects on consumer involvement in co-creation, and the P-value is  $0.000 < 0.05$ , so there is significant with it, Hypothesis 5 is supported.

## **5.5 Summary of Results**

To summarize the results mentioned above, the respondents cover all the category of each item. Although they were not relatively even of some data distributions, these 167 answers were still valid because the characteristics of this sample's group (such as gender, age, game experience, etc.) were basically consistent with the distribution of mobile players' group in previous study. After the first factor analysis, I removed one item of factor and merge two variables together. It could be seen that the result of second factor analysis are good since all the items can be

allocated to together as expected in Total Variance Explained table. In the reliability rest, the result was good as all the values of Cronbach's alpha of five scales are over 0.7. From Correlation Matrix and Regression Test, the factors of Incentive Mechanism, Members' Communication, Norm of Reciprocity indicated positive effects on consumer involvement in co-creation (See figure 3).

**Figure 3: Summary of Multiple Regression**



*Note: Numbers shows standardized beta coefficients. Solid lines mean significance and dotted line means not significance*

## 6. Discussion

*Based on the statistic result and theoretical framework, the findings of each factors are discussed in this chapter.*

This study examined the relationships between four characteristics of virtual communities and players' willingness of co-creation with company. It reveals that players' willingness to co-creation in online game communities can be predicted by the proposed model ( $R^2 = 63\%$ ). Three of the community characteristics (Incentive Mechanism, Members' Communication, Norm of Reciprocity) significantly affected players' willingness of co-creation. However, Quality of Interface did not impact on the player's willingness to co-create significantly.

### **Members' Communication**

First, my results reveal that Members' Communication significantly and directly influence the willingness to co-creation. Although previous studies showed that Members' Interaction and Integration of Communities are two different factors in virtual communities, however, because of the different context of online games, I combined these two factors together into Members' Communication. When the game communities are easier to join or there is more interaction in the communities, the players are more willing to join value co-creation process. This result echoes the finding of previous study (Wei and Lu, 2014), indicating that gamers are more likely to play certain mobile game apps if their most influential contacts also use play these mobile game apps. Besides that, the total number of players and peers are key to whether or not the

game is a success because the central concept of social gaming is interacting with real people (Fields and Cotton, 2012). From my data analysis, I can see that its Beta of standardized coefficients is the biggest one of all the factors, which means the Members' Communication is the most important factor to influence Chinese mobile player's co-creation.

### **Norm of Reciprocity**

The second finding from my empirical study is that Norm of Reciprocity plays a pivotal role in my research topic. Based on previous research, customers must expect to get some benefit from such participation in virtual communities and that these expected benefits in turn can strongly influence their future participation in value co-creation process (Satish and Robert, 2009). The virtual communities are open environment, but members' participation is affected by other members' opinion (Wei and Lu, 2014). In a word, the research results are consistent with the view that customers are not involved in these co-creation process just because of "altruistic" motives, on the contrary, they hope to obtain significant benefits from such participation.

### **Incentive Mechanism**

Incentive Mechanism of virtual communities is another factor that affects users' willingness to participate in co-creation. The statistics result showed that players do increase their involvement in the beta test when the online game provider offers sufficient product related benefits, including virtual goods or psychological reward, to attract them. These benefits as incentives raised players' willingness to participate in a co-creation activity. Some studies also confirmed this conclusion, either monetary benefits or non-monetary benefits could be the incentives for consumers to participate in co-creation (Füller, 2010).

## **Quality of Interface**

Although previous study (Zhang and Li,2017) has mentioned that Quality of Interface has an impact on value co-creation, this factor of the predicted model was not validated in the data analysis. Apart from sample-specific reasons, there may exists two causes to explain this result. Firstly, some other latent factors may have not been considered here. For example, there could be individual characteristics of customers that moderate or influence the wiliness of co-creation (Satish and Robert ,2009). However, such customer-specific factors were not included in the scope of this study, it can be discussed and clarified in the further study.

Another reason may be that this study did not subdivide the mobile social game in the questionnaires due to limited time and resource. For different games, the Quality of Interface may not have the same effect on the wiliness of co-creation. As a result, the data analysis did not reflect the effect of this factor. different communities require different types of attention and motivation. As Thierry and Patrick (2011) mentioned, different communities require different types of attention and motivation, there is not a unique and universal tool for harnessing all types of communities.

## 7. Conclusion

*This chapter begins with the conclusion of this whole study, and then the managerial implications are given. In the end, the limitation of this study and suggestions for future studies are presented.*

### 7.1 Conclusion of this study

In the past, value co-creation of the game industry mainly focused on the new product development stage. For example, some gamers who have the knowledge of programs change a game through computer programming with software tools that are not part of the game. These gamers share these programs with other game players for free (Sang et al.,2016).

However, online games are different from traditional console games in value co-creation process. The value co-creation process of online games is not stopped after the game products are developed. On the contrary, the content of online game is updated through the subsequent version updating to prolong the game life cycle. Therefore, game companies must obtain users' preferences and habits in various ways to generate more game-related communities, such as game video communities, e-sports communities, etc.

This study created a model based on the characteristics of the virtual community and the player's willingness to co-create. The results show that Incentive mechanism, Members' communication, Norm of reciprocity has positive influence on players' willingness of involve in co-creation. This thesis also provides a new perspective for value co-creation research. The previous studies mainly focused on the impact of the players' perceived value or interaction on value co-creation,

but did not research on value co-creation from the characteristics of the virtual community. This research integrates the characteristics of the virtual community and studies its mechanism of influencing the consumer's value co-creation.

Besides that, the previous studies did not subdivide the player groups, most of the studies focus on the communities of tester types or developer types, lack of the research in the communities of player type. This thesis research on this new type of online mobile game.

## **7.2 Managerial Implication**

The characteristics of the virtual communities have a positive effect on the players' value co-creation. This means that the game company can mobilize the players' enthusiasm for participating in value co-creation activities by providing positive reward mechanisms, effective reciprocity norms, and improving the level of communication among members. This requires each game company to build a unique online player community in order to fully mobilize the enthusiasm of players to participate in various game activities, and to use their creativity as competitive advantage.

## **7.3 Limitations and Suggestion for future research**

The deficiencies of this study are mainly reflected in the following two aspects.

Firstly, the characteristics of the virtual communities used in this study are based on the summarization of previous studies and are not obtained through qualitative research methods.

In fact, it is very likely that there exist some communities' features that have not been



discovered yet by the researchers. For the future research, in order to ensure the completeness and rigor of the study, qualitative research methods can be used to explore the characteristics of the virtual community, and then study the impact mechanism of the relevant community characteristics.

Secondly, the object of this study is the Multiplayer Online Mobile Game. However, due to limited time and effort, this study did not further subdivide multiplayer online mobile games, and the conclusions may differ for different games. Subsequent studies may conduct separate investigations for different games to test the applicability of the findings.

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## Appendix 1 Questionnaire on "Multiplayer Online Mobile Gaming Players

### Participating in Game Company Co-creation"(English)

Hello, thank you very much for your participation in this survey. This questionnaire will be used in the research about “multiplayer online mobile game (MMOG) players taking part in co-creation with game company”, the purpose is to analyze the factors of player community which influence players to take part in the innovation game company. This questionnaire is anonymous form, all data is only used for academic research and analysis. The questionnaire takes about 3 minutes. Thank you for your cooperation!

Note: MMOG stands for massive multiplayer online game. It is often divided into the following categories: role-playing, shooter, real-time strategy, athletics, etc. The popular games: Strike of Kings, Player Unknown's Battlegrounds, Onmyoji , and Werewolf are belong to this category.

#### Part One Personal Background

1. Your gender :

- ☐Male      ☐Female

2. Your age range :

- ☐Under 18      ☐19~25      ☐26~29      ☐30~34      ☐35~39      ☐40+

3. Your current occupation :

- ☐Students      ☐Full-time Job      ☐Freelance      ☐Others

4. Your highest academic qualification:

- ☐High school or below  
High school      ☐College      ☐Bachelor      ☐Master and above

5. Your monthly income(Chinese Yuan) ?

- ☐1000 or below (including no income)      ☐1001-3000      ☐3001-5000  
☐5001-10000      ☐10001+      ☐Inconvenience to disclose

6. How much money do you spend per month on this mobile game during your playing ?

☐Never spend money     
 ☐1-10 Yuan     
 ☐11-50 Yuan     
 ☐51-100Yuan     
 ☐more than 100 yuan

7.How long have you played multiplayer online mobile games(from the first game you played before)?

☐Never played before [Skip to the end of questionnaire and submit the answer sheet]     
 ☐Less than 6 months     
 ☐6 months to 1 year (excluding 1 year)

☐1 to 2 years (excluding 2 years)     
 ☐2 ~ 3 years (excluding 3 years)     
 ☐3 years and above

8. How often do you play multiplayer online mobile games?

☐Mutple times a day     
☐1 or 2 times a day     
☐Once in a few days     
☐Once or less per week

**Part II: The following is a survey of factors which influence co-creation. Each statement has seven different levels of options ("1" indicates complete disapproval; "7" indicates full approval).**

**(Note: Co-creation refers to the user's active participation in the game company's products or services. For example, advice about new product development of games; generate game-related content such as video and article of gaming strategy; exchange and share information to other players in the game, etc.)**

**Please take a mobile multiplayer online game which you played before as a reference (such as Glory of Kings, Player Unknown's Battlegrounds, Onmyoji , and Werewolf, etc.), select the corresponding options in your mind.**

9. The design of the game mode is interesting

☐1     
☐2     
☐3     
☐4     
☐5     
☐6     
☐7

10. This game fix bug very timely

☐1     
☐2     
☐3     
☐4     
☐5     
☐6     
☐7

11. The content of this game related content (such as game videos, strategies, game live, etc.) is very informative

☐1     
☐2     
☐3     
☐4     
☐5     
☐6     
☐7

12. The design of this game rule is fair

☐1     
☐2     
☐3     
☐4     
☐5     
☐6     
☐7

13. This game is easy for beginners

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

14. This game rewards active players with virtual goods (such as daily coins, game equipment, etc.)

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

15. This game has a psychological reward for active players such as game title, game honor, rating, etc.

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

16. This game rewards players for sharing game content (such as game records, game titles, etc.) on social platforms (such as WeChat, Weibo).

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

17. In this game, players exchange frequently (such as chat, equipment trading, etc.)

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

18. If I send a game team request, time for waiting others to join the team is usually very short

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

19. Outside the game, I still have contact with some game players

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

20. The game company often have some online or offline interactive activities with players

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

21. In the process of playing in a team with other players, I felt a sense of collective or closeness

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

22. Compared to other games, I prefer the player community of this game

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

23. If this game has a game union, I think it is beneficial to join a union in this game.

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

24. Compared to other games, I feel that the characteristics of this game player communities are more similar

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

25. In this game, it is not difficult to become familiar with other players

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

26. When helping others or sharing experiences in the game, I think I also have gained some experience in this process



☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

27. I think other players in the game will help me, so it's fair and reasonable for me to help others.

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

28. When sharing ideas or solving others' problems in games or in related communities, I believe that I can get more responses when I need them

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

29. I am willing to participate in the creative process of new products or game content development initiated by game companies

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

30. I would like to share my game experience or video with other players

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

31. If I have ability, I am willing to give help or guidance to other players in the same game union or game team.

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

32. If there are some DIY tools of game (such as self-designed game equipment, costumes, etc.), I would like to try

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

## Appendix 2 Questionnaire on "Multiplayer Online Mobile Gaming Players

### Participating in Game Company Co-creation"(Chinese)

#### 关于“多人在线类手机游戏玩家参与游戏公司共同创新”的调查问卷

您好，非常感谢您参与此调查问卷，本次问卷将用于“多人在线类手机游戏（MMOG）玩家参与游戏公司共同创新”的研究，目的是分析影响玩家参与游戏公司共同创新意愿的游戏社区特性。本问卷采用匿名形式，所有数据仅供学术研究分析使用，问卷时长大约为 3 分钟，感谢您的配合！

注：MMOG 全称是 Massive multiplayer online game，即大型多人在线游戏。常分为以下几种：角色扮演类，第一人称射击类，即时战略类，竞技类等，目前流行的王者荣耀，绝地求生，阴阳师，饭局狼人杀等手机游戏皆属于此类。

#### 第一部分 个人背景

1. 您的性别：

☐男 ☐女

2. 您的年龄段：

☐18 岁以下 ☐19~25 ☐26~29 ☐30~34 ☐35~39 ☐40 岁以上

3. 您目前从事的职业：

☐在读学生 ☐全职工作 ☐自由职业 ☐其他

4. 您的最高学历是（包括在读）？

☐高中/中专/技校及  
以下 ☐大专 ☐本科 ☐硕士及以上

5. 您的月收入为？

- ☐1000 元及以下（含无收入）    ☐1001-3000 元    ☐3001-5000 元  
☐5001-10000 元    ☐10000 元以上    ☐不便透露

6. 在您游玩一款游戏期间，您在该款手机游戏上平均每月约花费多少钱？

- ☐从不花钱    ☐1-10 元    ☐11-50 元    ☐51-100 元    ☐100 元以上

7. 您玩多人在线类手机游戏多久了（从您玩的第一款游戏算起）？

- ☐没玩过（跳至第问卷末尾，提交答卷）    ☐小于 6 个月    ☐6 个月~1 年（不含 1 年）  
☐1~2 年（不含 2 年）    ☐2~3 年（不含 3 年）    ☐3 年及以上

8. 您玩多人在线类手机网络游戏的频率

- ☐每天多次    ☐每天 1~2 次    ☐几天一次    ☐每周 1 次或以下

**第二部分：以下是有关共同创新因素的调查。每个陈述都有 7 个不同程度的选项（“1”表示完全不赞同；“7”表示完全赞同）。**

（注：共同创新是指用户积极参与游戏公司产品或服务的相关环节。例如给游戏新功能建议；产生游戏相关直播，攻略等内容；游戏中交流分享信息给其他玩家等。）

请您以您玩过的一款手机多人在线网络游戏为参照物（如王者荣耀，绝地求生，阴阳师，饭局狼人杀等），选择您心中对应的选项。

9. 这个游戏模式的设计很有意思

- ☐1    ☐2    ☐3    ☐4    ☐5    ☐6    ☐7

10. 这个游戏修复 bug 很及时

- ☐1    ☐2    ☐3    ☐4    ☐5    ☐6    ☐7

11. 这个游戏相关的内容（如游戏视频，攻略，游戏直播等）信息很丰富

- ☐1    ☐2    ☐3    ☐4    ☐5    ☐6    ☐7

12. 这个游戏玩法设计比较公平

- 1      ○2      ○3      ○4      ○5      ○6      ○7
13. 这个游戏对于初学者容易上手
- 1      ○2      ○3      ○4      ○5      ○6      ○7
14. 这个游戏对于活跃的玩家有虚拟货品的奖励（如每日游戏币，装备等）
- 1      ○2      ○3      ○4      ○5      ○6      ○7
15. 这个游戏对于活跃的玩家有称号、游戏荣誉等级等心理上奖励
- 1      ○2      ○3      ○4      ○5      ○6      ○7
16. 这个游戏对于玩家在社交平台（如微信，微博）上分享游戏内容（如游戏记录，称号等）有奖励
- 1      ○2      ○3      ○4      ○5      ○6      ○7
17. 这个游戏中，玩家间交流频繁（如聊天，装备交易等）
- 1      ○2      ○3      ○4      ○5      ○6      ○7
18. 如果我发出一个游戏组队请求，等待别人加入组队时间通常很短
- 1      ○2      ○3      ○4      ○5      ○6      ○7
19. 在游戏之外，我仍然与游戏中的某些玩家有联系
- 1      ○2      ○3      ○4      ○5      ○6      ○7
20. 游戏官方和玩家常有些线上或线下的互动活动
- 1      ○2      ○3      ○4      ○5      ○6      ○7
21. 在与其他玩家组队游戏的过程中，我感受到了集体荣誉感
- 1      ○2      ○3      ○4      ○5      ○6      ○7
22. 相比其他游戏，我更喜欢这个游戏的玩家群体
- 1      ○2      ○3      ○4      ○5      ○6      ○7
23. 如果这个游戏有游戏公会，我认为加入这个游戏内的工会是有好处的
- 1      ○2      ○3      ○4      ○5      ○6      ○7
24. 相比其他游戏，我感觉这个游戏玩家群体的特性更接近
- 1      ○2      ○3      ○4      ○5      ○6      ○7
25. 在这个游戏中，与其他玩家熟悉起来并不困难
- 1      ○2      ○3      ○4      ○5      ○6      ○7
26. 在游戏中帮助别人或者分享经验时，我认为在这个过程我自己也获得一些心得
- 1      ○2      ○3      ○4      ○5      ○6      ○7

27. 我认为在游戏中其他玩家会帮助我，所以我帮助别人也是很公平合理的

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

28. 在游戏内或相关社区分享心得或解决他人问题时，我相信当我有需要时能获得更多的回应

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

29. 我愿意参加游戏公司发起的新产品或游戏内容的创意征集活动

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

30. 我愿意把我的游戏体验或视频分享给其他玩家

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

31. 在我有能力的情况下，我愿意对同一游戏公会或游戏队伍中的其他玩家给予游戏帮助或指导

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7

32. 如果游戏内有一些可以 DIY 的游戏工具（如自己设计道具，服装等），我愿意尝试

☐1      ☐2      ☐3      ☐4      ☐5      ☐6      ☐7