

P2P STREAMING MEDIA INDUSTRY IN CHINA

by

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Abstract

The peer-to-peer (P2P) streaming media industry opened up a new era for the cyber age, has had a significant effect on many people's leisure time, and has changed the way many people use entertainment. Over the past few years, this industry has developed dramatically in China, and it is thriving. In terms of the current situation, the P2P streaming media industry holds typical Chinese features that both enrich the audience's cultural life, and have some impact on other kinds of mass media.

This paper analyzes the P2P streaming media industry in China in order to recommend solutions to the challenges faced by the industry. It introduces various technical terms related to P2P and describes the overall industrial situation of P2P streaming media in China. It utilizes Porter's Five Forces model for an analysis of the entire industry and assesses key success factors (KSFs). Concurrently, this article identifies the competitive advantages of P2P streaming media over other forms of media delivery, and examines its influence on other industries. It is important to note that P2P streaming media does face various obstacles in its developmental stages, and it is developing, but this paper makes strategic recommendations for solutions to the challenges that P2P streaming media faces.

Keywords: P2P; P2P streaming media; P2P streaming media operator; online video

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Glossary

P2P	stands for "peer-to-peer." In a P2P network, the "peers" are computer systems which are connected to each other via the Internet.
P2P streaming media	is based upon a P2P platform and creates new nodes with the demand for content, thereby increasing the total capacity of the network system while improving robustness by replicating data over multiple peers.
P2P platform	refers to a virtual networking where P2P end-users could share and exchange information and documents.
P2P streaming media operator	is the operator that does business dependent on P2P streaming media technology, and that provides P2P streaming media services to the audience through software.
End-user of P2P streaming media	is the audience that watches programmes through P2P streaming media software, or through visiting P2P streaming media websites, at least once per month.
Online video industry	includes video sharing websites and P2P streaming media.
Traditional TV	means central or provincial TV stations in China.
IPTV	(Internet Protocol Television) is a system where a digital television service is delivered using Internet Protocol over a network infrastructure, that is, a broadband connection.

1: Introduction

This thesis provides an industry analysis of the P2P streaming media industry in China. It is an emerging market that has grown rapidly over the past four to five years.

P2P stands for "Peer to Peer." In a P2P network, the "peers" are computer systems which are connected to each other via the Internet. Files can be shared directly between systems on the network without needing a central server. In other words, each computer on a P2P network becomes a file server as well as a client (TechTerms.com, 2009). A P2P network enables end-users to share a proportion of their own information simultaneously with others on the same network.

P2P streaming media is based on P2P technology, and new nodes are created to facilitate the demand for contents. It is a brand new programme (i.e., a media product, like a movie or TV show) delivery technique. P2P streaming media end-users do not download the entire programme; instead, they buffer segments of the programme's contents while the streaming data is delivered and played. Hence, the audiences are watching simultaneous programmes.

The P2P streaming media industry in China emerged around 2004 and saw considerable growth in 2005. From 2006 on, the industry has seen truly thriving development. Currently, there are over 200 P2P streaming media operators of various business sizes (both big and small) which compete within the industry; however, four industry leaders (PPLive, PPStream, QQLive and UUSee) seized the majority of the total market share. Various medium-to-small sized operators face elimination due to the competitive advantages that the aforementioned industry leaders now possess.

In terms of the market, the number of internet users in China grew from 111 million in 2005 to 298 million in 2009 while the number of broadband users in China increased from 64.3 million in 2005 to 270 million in 2009. Thanks to the dramatic increase of internet users and the development of broadband techniques, P2P streaming media users have grown year by year. By the end of 2008, about 109 million people had watched programmes through P2P streaming media in China (iResearch, 2009).

Additionally, the revenue of the industry grew steadily. Because the contents on P2P streaming media are totally free for the audience, the major source of income comes from advertisements. Advertisements contribute to over 70% of the entire revenue, whereas the other 30% comes from interactive value-added services and technology

support. In 2008, the market revenue was about 247 million RMB, which is approximately a 150% increase from that of 2007 (iResearch, PPCN, 2008).

Therefore, we can conclude that P2P streaming media industry is a healthy and promising industry in China. By understanding industrial competition, entry barriers for new entrant, threat from substitutes, bargaining power of both supply and buyer, the industry status is more explicit. In Chapter 2, this study will introduce some technical terms related to P2P and P2P streaming media. The overall industrial situation of P2P streaming media in China, including its development phase, market size, and market share, will be provided in Chapter 3. In Chapter 4 is a deep Five Forces analysis of the entire industry, and key success factors will be considered. In Chapter 5, this article will indicate the competitive advantages of P2P streaming media, consider its influence on other industries, and consider predicted future trends. The bottlenecks that P2P streaming media faces during its developmental stages will be discussed in Chapter 6. Finally, this article offers various strategic recommendations in Chapter 7 that could help P2P streaming media to overcome the obstacles.

2: Background of P2P Technology

2.1 P2P

P2P, which is the abbreviated term for peer-to-peer, refers to a kind of ad-hoc computer networking. It delivers services in which the participants share a portion of their own resources simultaneously (Wikipedia, 2009).

A P2P service has two special features: it enables end-users to share and exchange information directly, and it is not based on the client-server model.

The traditional client-server computing model demands users to first connect to a server, then download and view; however, the P2P network only has equal peer nodes that act as both servers and clients to other nodes on the same network. Figure 2-1 and 2-2 illustrates the difference between the P2P model and the traditional client server model. Every user in a P2P network uploads content while downloading and viewing the files (All-streaming-media, 2009). Therefore, it eliminates the intermediaries, which are the servers, and shortens the time for end-users to connect to the servers.

Figure 2-1 Client-Server Model

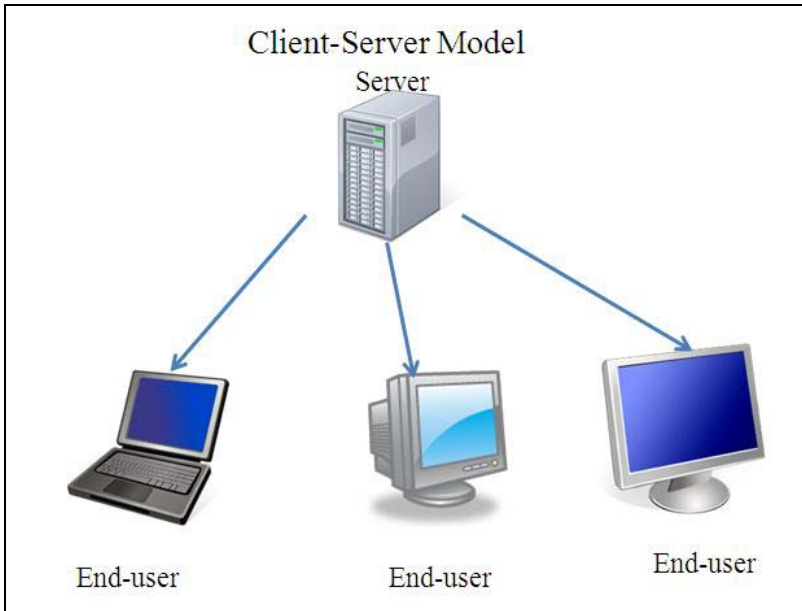
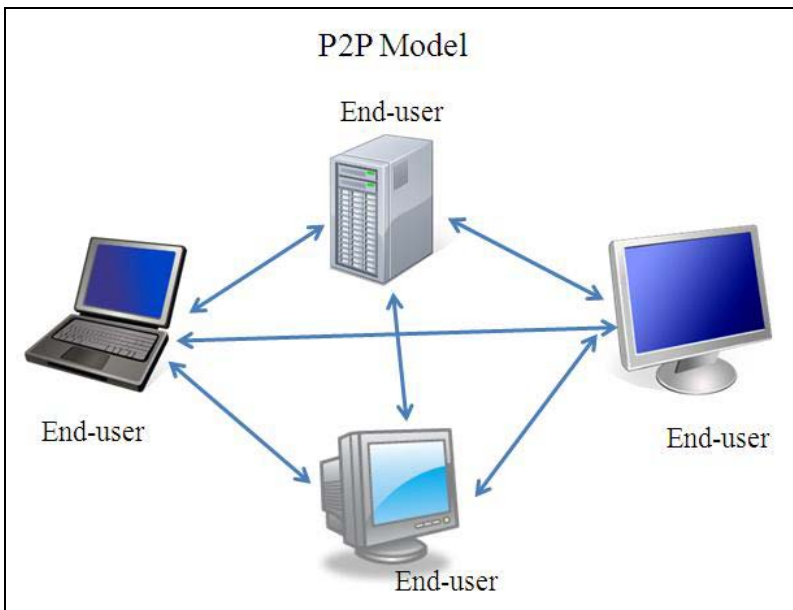


Figure 2-2 P2P Model



P2P changes the website-centred model and returns power right back to the internet users (Hongbo Wang and Yihui Ma, 2007). End-users can freely share and select

contents on a P2P network. Because the files or programmes shared on the internet are now positioned at the “edge” (with the end-users) and not at the “centre” (with the servers), the previous memory method is altered. The P2P mode is similar to face-to-face communication and connecting through the telephone.

The P2P technique not only provides a brand new networking platform, but it also offers an unprecedented operating mode for online TV (Wenming Li, Meng Xia, 2009) because users can re-watch downloaded and saved programmes off the internet using the P2P system. Furthermore, based on the P2P technique, streaming media software allows people to watch live TV programmes.

2.2 P2P streaming media

P2P streaming media is based upon a P2P platform (a virtual networking system where P2P end-users can share and exchange information and documents). It creates new nodes with the demand for content, which increases the total capacity of the network system while improving robustness by replicating data over multiple peers (Business Wire, 2008). It is regarded as a revolutionary technology in terms of delivering contents. Before watching, users are not required to download the entire programme; instead, they

buffer segments of the contents while streaming data are delivered and played. Hence, compared with downloading, it helps end-users save time and memory space.

P2P streaming media has two advantages. First, because a P2P based streaming media network can distribute media data without the support of routers and specific network infrastructure, it is cost-effective and easy to deploy. Second, P2P technology enables data only to be saved to a virtual networking system rather than it being saved on the computers' hard discs. Accordingly, it can prevent viewers from abusing copyrights, and, to some extent, it protects broadcasted programmes.

Additionally, thanks to the application of P2P technology, when users are watching streaming media, they are simultaneously uploading contents and exchanging data with other users watching the same video. Everyone becomes a server (broadcaster). Hence, the more users there are online, the better the quality of the video can be, and the faster the video can be downloaded.

2.3 P2P streaming media and other online videos

This section describes the differences between P2P streaming media and two other forms of online videos: IPTV and video sharing websites. Like traditional TV, both are considered as substitutes for P2P streaming media.

2.3.1 IPTV (e.g. SMG.cn)

IPTV is the abbreviation for Internet Protocol Television. It is officially defined by the International Telecommunication Union as multimedia services that deliver television/video/audio/text/graphics/data over IP-based networks that provide the required level of quality of service and experience, security, interactivity and reliability (Wikipedia, 2009).

Most IPTV providers directly broadcast TV programmes online; however, users are required to pay monthly rental fees. In China, cable TV is more popular than broadband access, and neither IPTV, cable TV, nor broadband access is available without a fee. Given the choice between choosing to pay fees for IPTV and cable TV, the great majority would choose cable. Unlike IPTV, P2P streaming media is free of charge, and it offers more types of programmes. Although, like P2P streaming media, IPTV provides good quality programmes to audiences and the end-users do not need to download the content, P2P streaming media is more competitive when it comes to price as well as the quantity of available programmes.

2.3.2 Video sharing websites (e.g. YouTube.com)

Video sharing websites and P2P streaming media both belong to the online video industry; however, they are quite different in terms of their operating models and in regards to future developments. Individuals mainly upload videos to video sharing websites, thus the quality is below professional standards, whereas P2P streaming media creates a video platform with plenty of high-quality programmes. The latter attracts an audience through providing a video service. In terms of technical principles, video sharing websites are based on a client-server model, whereas P2P streaming media is based on a server-server model.

More information and further analysis about P2P streaming media and other online video services will come in Chapter 4, including the advantages of P2P streaming media, its competition, and user preferences.

3: P2P Streaming Media Industry in China

3.1 Development phase

P2P streaming media in China emerged around 2004 when the first P2P streaming media software, CoolStreaming, was invented and tested online during the European Cup of that year. In 2005, real business operations began because several leading P2P streaming media operators received the first round of financial investments from venture capital (VC) firms. For instance, PPStream, a start up P2P streaming media operator headquartered in Shanghai, China, was invested with more than one million USD from Ceyuan Ventures (iResearch, 2007). The support of VC funding has spurred the streaming media operators to continuously improve the P2P streaming technology and to promote their services.

Since 2006, the P2P streaming media industry has been thriving. Most of the top streaming media platforms have improved significantly in terms of the number of users, overall revenue, and earnings from advertisements. For example, in 2006, approximately 40 million people watched P2P streaming media at least once a month, representing a 233% increase from 12 million in 2005. In 2007, the industry grew further. Brand images

were built up amongst the audience and a business model was established. The top four leaders, namely, PPStream, PPLive, UUSee and QQLive, have captured 74.8% of the total market share leaving the remaining market share to the smaller players (hc360, 2008). Partially because the big operators have built up positive company images, the majority of the audiences utilize the industry leaders' services. Additionally, many second-round VC investments were brought in for further technological and market development. For example, UUSee received 23.5 Million USD in 2007 from five VC firms including Draper Fisher Juvetson, Streamboat Ventures and so on (PPCN, 2007). This was the largest financing among the online video companies in China.

It is considered that the industry had largely matured by about 2008. Industry leaders were equipped with sufficient financing capital, legal programme resources, and channels of income, while uncompetitive companies were eliminated, and capable leaders survived and seized the majority of the market (e.g. Mymate closed down in 2008 due to insufficient capital support). Moreover, the State Administration of Radio Film and Television (SARFT) in China issued a regulation concerning tightening the management of contents in video and audio programmes on the internet at the beginning of 2009 (SARFT, 2009). According to this regulation, any programmes without copyright would

be forbidden to circulate on the internet; therefore, the P2P streaming media industry would be rectified and could develop steadily in the future.

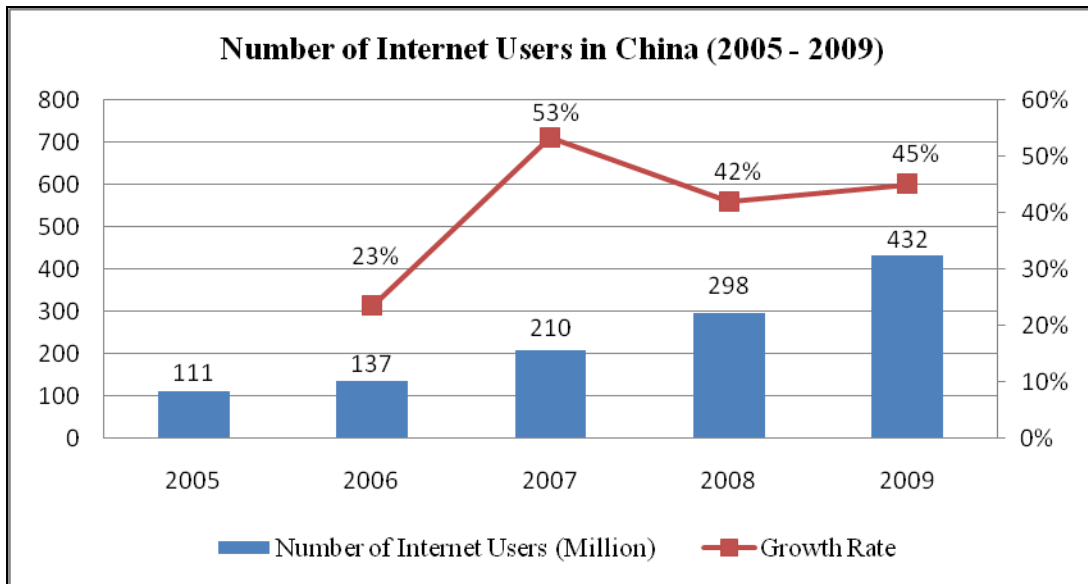
3.2 Market size

Two elements fundamentally powered the P2P streaming media industry's progress: the development of the internet, especially broadband, and the increase in and savvy of internet users. The Chinese broadband technique is now first class, and increasingly Chinese people are becoming aware of this convenient media. Most importantly, the huge increase in the internet population activates the entire industry.

3.2.1 Number of internet users and broadband users in China

According to the China Internet Network Information Centre (CNNIC), in 2008, the internet users rocketed from 210 million in 2007 to approximately 298 million, which is a 41.9% increase, and the popularity rate grew to 22.6% of the population (CNNIC, 2009). China surpassed the US and became the country with the most internet users. Figure 3-1 illustrates the increase of internet users from 2005 to 2009; the line shows the growth rate. All data were collected from CNNIC. Based on the previous trend, the author estimates that the number of users in 2009 would increase marginally.

Figure 3-1 Number of Internet Users in China (2005 - 2009)

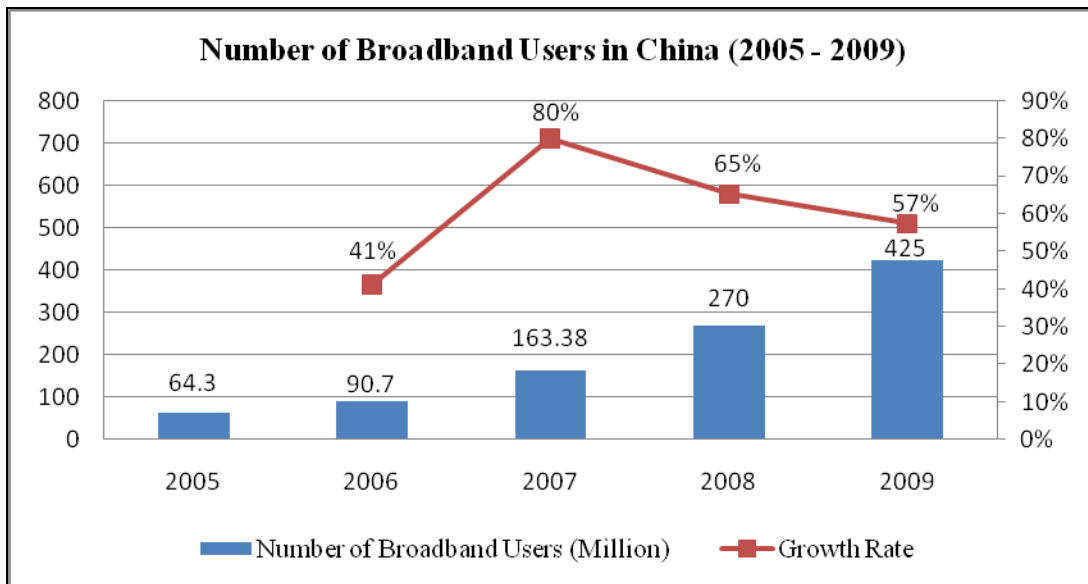


Source: Adapted from the data in the websites CNNIC (2009)

Furthermore, since P2P streaming media technology relies on broadband for transit, the increase of broadband users is another important index. The latest data from Broadband Forum (a US Broadband organization) shows that in the first quarter of 2009, China has 88.088 million broadband users, which continuously ranks number one in the world (XinHuaNet, 2009). Although the proportion of internet users that use broadband is less than 7% of the total, the broadband market segment still offers a rich venue for the future development of P2P streaming media. Figure 3-2 indicates the increase of broadband users from 2005 to 2009, in which the line shows the growth rate. All data

were collected from CNNIC. Based on the previous trend, the author estimates the number of broadband users in 2009.

Figure 3-2 Number of Broadband Users in China (2005 - 2009)



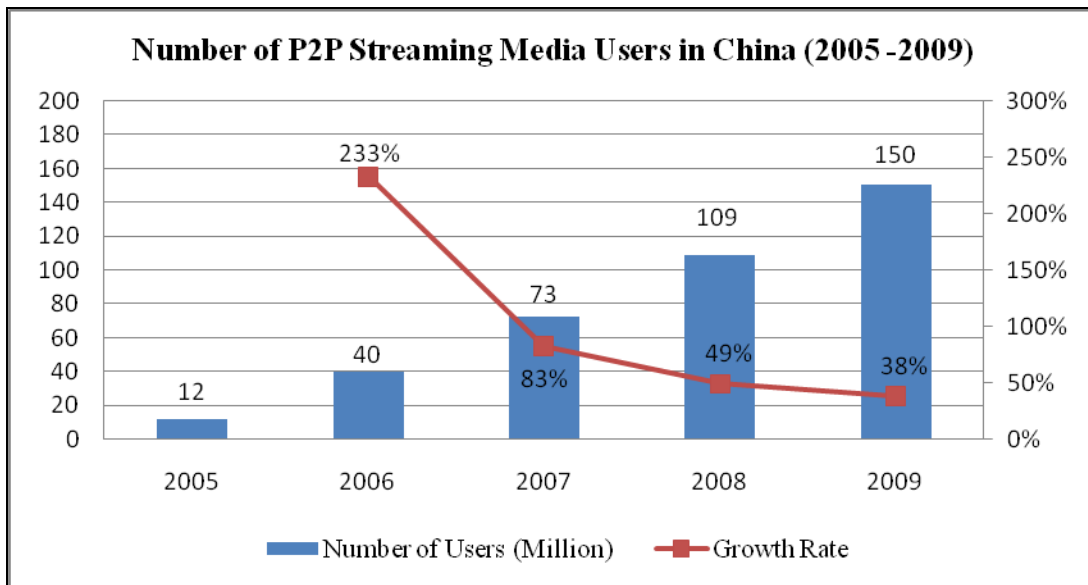
Source: Adapted from the data in the websites CNNIC (2009)

Given that the majority of the potential audience of P2P streaming media comes from both internet users and broadband users, the growth of these user groups provides an external incentive to stimulate the progress of P2P steaming media. Moreover, currently the broadband technology in China is amongst the world's best. From a technical perspective, the developed broadband could enhance P2P streaming media's broadcasting quality and speed.

3.2.2 User number of P2P streaming media in China

According to a statistical report by iResearch, by the end of 2008, 109 million people had watched programmes through P2P streaming media (iResearch, 2009). These people use P2P streaming media at least once per month. Figure 3-3 indicates the user scale of P2P streaming media in China from 2005 to 2009; the line shows the growth rate. All statistical data were collected from iResearch. The author estimates the number of P2P streaming media users in 2009 based on the former trend.

Figure 3-3 Number of P2P Streaming Media Users in China (2005 - 2009)



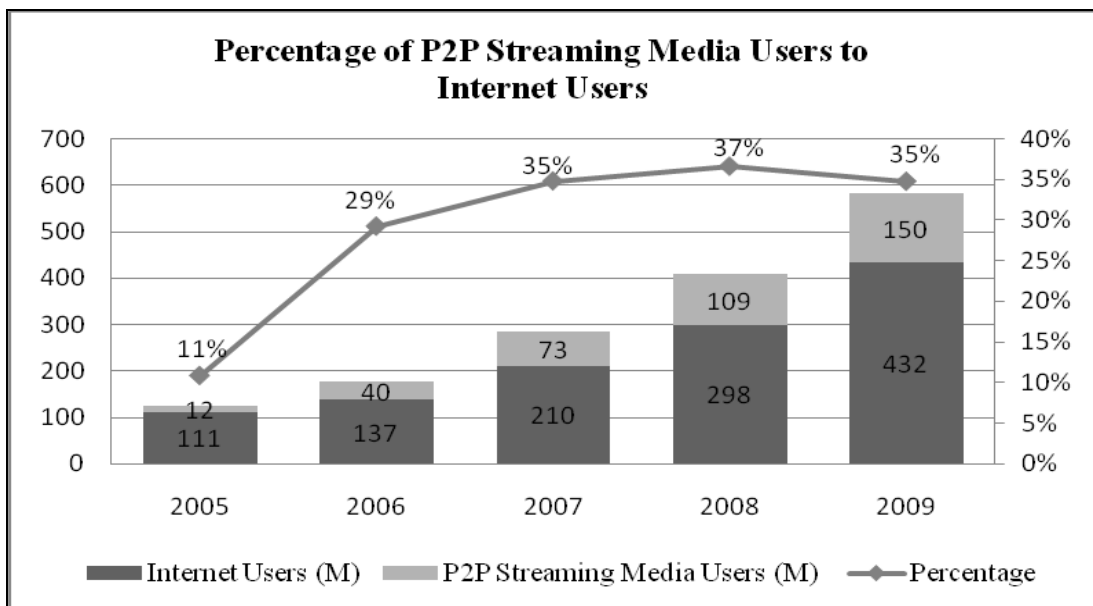
Source: Adapted from iResearch (2008)

While the general trend shows a significant rise in users over the past five years, the decreasing growth rate indicates that each successive phase of P2P streaming media

development has attracted a smaller percentage of users. Particularly after 2008, the industry will show a lesser degree of development. Nevertheless, due to the huge user base number, P2P streaming media still has a promising future.

Combining Figure 3-1 and Figure 3-3, we can calculate the annual percentage of internet users which are also P2P streaming media users (see Figure 3-4). The overall trend is 30 to 35% from 2005 to 2009. That is to say, a relatively stable group of internet users currently watch videos through P2P streaming media. Benefiting from the increasing internet users in China, P2P steaming media has good opportunities for the future.

Figure 3-4 Percentage of P2P Streaming Media Users to Internet Users



Source: Adapted from the data in the websites CNNIC (2009) and iResearch (2008)

3.3 Market share

3.3.1 Market share of top four operators

As introduced above, the main industry leaders of P2P streaming media in China are PPLive, PPStream, QQLive and UUSee. Still, more than 200 companies compete in the P2P streaming media industry (PPCN, 2007). The market share of the top four operators in the industry is illustrated in Table 3-1.

Table 3-1 Market Share

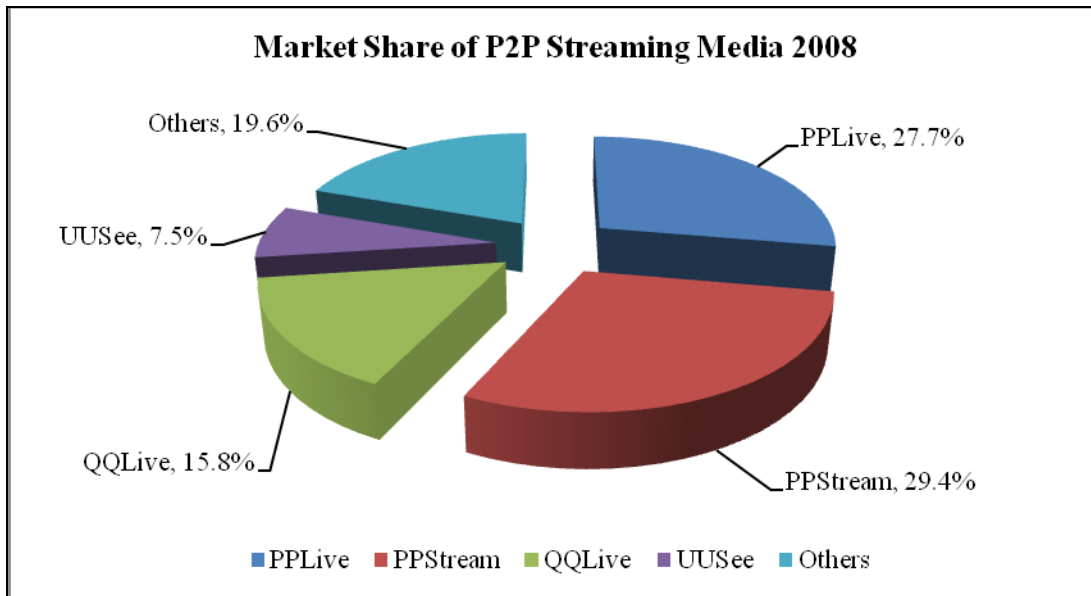
	2006	2007	2008	2009*
PPLive	30.2%	28.4%	27.7%	28.1%
PPStream	17.4%	24.3%	29.4%	31.6%
QQLive	19.5%	17.9%	15.8%	14.1%
UUSee	5.3%	4.2%	7.5%	8.2%
Others	27.6%	25.2%	19.6%	18.0%

Source: Adapted from the data in the websites PPCN.Net, CNNIC, and iResearch (2006-2008)

*The data in 2009 are estimated by the author based on the growth rate of PC users

During the past three years, the top four operators have maintained their stronghold in the industry, and the market shares show a degree of stability. Figure 3-5 is a graphical illustration of the 2008 data from Table 3-1.

Figure 3-5 Market Share of P2P Streaming Media 2008

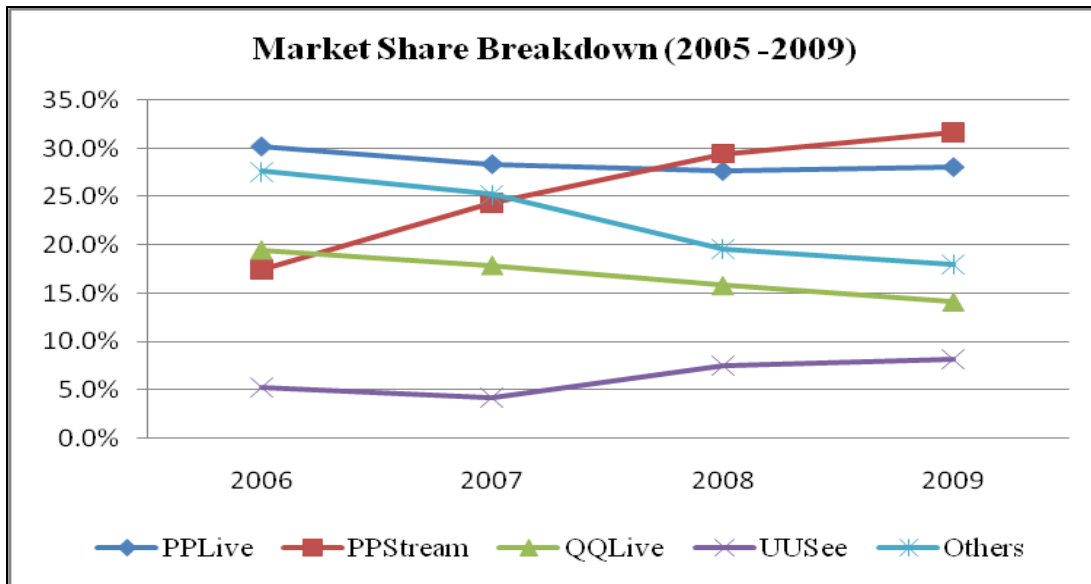


Source: Adapted from the data in the websites PPCN.Net, CNNIC, and iResearch (2006-2008)

3.3.2 Industry leaders

Except the increase of PPStream's market share, there are not huge changes in the market share for of other industry leaders. Figure 3-6 graphs the data in Table 3-1 to further illustrate the developing trends in the industry leaders' market share.

Figure 3-6 Market Share Breakdown (2005 - 2009)



Source: Adapted from the data in the websites PPCN.Net, CNNIC, and iResearch (2006-2008)

* The data in 2009 are estimated by the author based on the growth rate of PC users

PPLive

PPLive, the oldest of the top four leaders, was founded at the end of 2004. It began testing operations before the other leading companies were formed. Because it was based on an educational network at a university in its initial phase of development, PPLive has very high brand popularity and a loyal audience. In particular, the average number of daily online users for PPLive was about 1.2 million in 2007 (iResearch, 2007). The first mover advantage is one reason why PPLive continues to capture a large portion of the market share.

PPLive's user "stickiness" (i.e. adherence) is above the industry average.

According to the latest statistics from iUserTracker, by the end of March 2009, the average duration for users utilizing PPLive was 2,202.9 seconds (36.7 minutes). This is 150% longer than the second highest company's user duration, which is only about 24 minutes (iUserTracker, 2009). User duration is a crucial index of user stickiness, and it represents the audience's preference for a particular online video software (PPCN, 2008). The longer the duration is, the higher the user stickiness is. Hence, the "stuck" audiences account for PPLive's large market share.

PPStream

Since 2007, when it received a second round of 10 million USD investments from VC, PPStream has been a fast growing company. Due to the sufficient capital, PPStream has been able to focus on its technology, which is its most important advantage. PPStream can ensure that more than a 700,000 person audience can simultaneously watch extremely smooth online video (PPCN, 2007). Meanwhile, by virtue of successful financing, PPStream launched a new service that allows users to request the broadcasting. It helped PPStream to gain popularity and attract a larger audience.

Moreover, before the 2008 Beijing Olympics, PPStream signed a contract with CCTV that enabled PPStream to broadcast the entire Olympic Games online, including the Opening Ceremony and Closing Ceremony. This finally brought in high audience ratings and increased its fame. PPStream surpassed PPLive, and it seized the largest market share. PPStream was conferred “the Best Growing Internet Enterprise in China 2008” by the China Internet Annual Summit Conference 2009 (PPCN, 2009). Following this trend, PPStream should lead the P2P streaming media industry in 2009.

QQLive

Relying on its website QQ.com and QQ (a chatting software, similar to MSN), QQLive captured good market share. Apart from watching online programmes, users of QQLive could communicate and exchange opinions with those who are on the same programme through QQ. By virtue of this unique advantage, QQLive provides interactive entertainment to its audience; however, since QQ.com is its sole support, QQLive is inferior to other competitors in terms of capital financing and programme copyright. Thus, QQLive has less content and fewer resources than its competitors do. This might help explain its slightly declining market share from 2006 to 2009.

UUSee

The main problem with UUSee may be that it has not developed the same recognition as its main competitors (Xinhua Kuang, 2007). Though it possesses considerable capital from VCs and broadcasting rights from television stations, UUSee did not promote itself when PPLive and PPStream originally conducted a succession of advertisements. This is why UUSee is in a distant fourth place in regards to market share within this industry. Nevertheless, by means of its financial and content strength, it is reasonable to forecast that UUSee will seize a bigger market slice in the future.

3.4 Market revenue

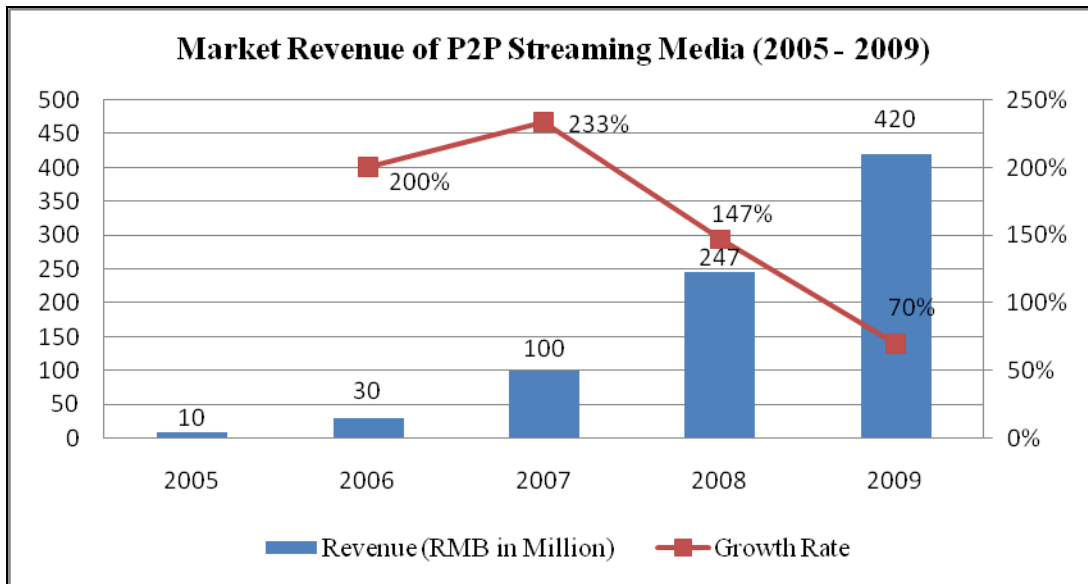
The key feature of P2P streaming media is the absence of user charges, which means that P2P streaming media operators offer totally free online programmes to their audience. Hence, market revenue does not include any type of service fee. There are three usual sources of revenue: advertisement, interactive value-added service, and technology support (iResearch, 2007). Examples of interactive value-added services are PPStream's request of broadcasting and QQLive's chatting room. Technology support refers to selling software to other IT companies.

The major proportion of income does not come from the latter two sources. In fact, more than 70% of the market revenue is derived from direct advertisement (iResearch,

2007). For example, the CEO of UUSee believes that 80% of UUSee's revenue came from advertising in 2007 (PPCN, 2008). Further analysis of advertising income will be covered in Chapter 5.

Figure 3-7 indicates the total market revenue of the P2P streaming media industry from 2005 to 2009. All data are collected from iResearch and PPCN.Net and arranged by the author. The author estimates the market revenue numbers based on previous trends. From the chart, we could conclude that although the growth rate is declining, the overall trend of market revenue is dramatically rising year by year. As this industry matures and develops, its market value is becoming attractive to the advertisers, many of which would like to take advantage of this promising business opportunity. For instance, PPStream currently shows advertisements from many well-known transnational corporations such as LG, Lancome, Puma, and P&G (PPCN, 2009).

Figure 3-7 Market Revenue of P2P Streaming Media (2005 - 2009)



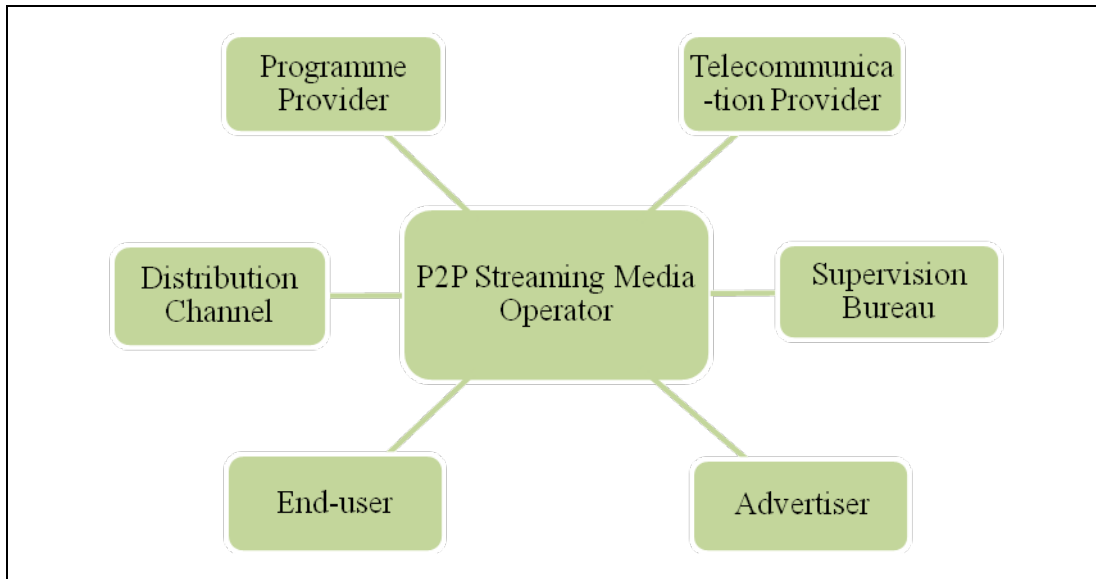
Source: Adapted from the data in the websites CNNIC (2009) and iResearch (2008)

4: Strategy Analysis

4.1 Industry structure

After about four to five years growth, the P2P streaming media industry has built up a full industry chain, including P2P streaming media operators, programme suppliers, telecommunication operators, end-users (the audience), advertisers, supervision bureaus, and distribution channels (Bo He, Xeliang Peng, 2009). Since the P2P streaming media technique could not gain a competitive advantage by itself, operators need to collaborate with programme providers such as television stations. Figure 4-1 illustrates the industry structure of P2P streaming media companies, which involves their relationships with multiple groups in the industry chain.

Figure 4-1 Industry Structure



In Figure 4-1, distribution channels refer to IT companies who exchange IT technology or do content cooperation with P2P streaming media operators. P2P streaming media operators provide technical support to broadband operators that belong to distribution channels. For example, PPStream have a long-term cooperation with Sina Video¹ and V iFeng² (Weifeng Xu, CEO of PPStrem, 2008). The PPStream's cooperative experiences not only expand its excellent fame, but also enable PPStream to consolidate and perfect its technology. The supervision bureaus are Chinese governmental departments that supervise the video and audio websites, control the online information, and standardize the programmes. These governmental bureaus include: SARFT (the State

¹ <http://video.sina.com.cn/>

² <http://v.ifeng.com/>

Administration of Radio Film and Television); MCPRC (Ministry of Culture of the People's Republic of China); and MIITPRC (Ministry of Industry and Information Technology of the People's Republic of China).

4.2 Five Forces analysis

4.2.1 Industry competitors and rivalry

Competition is high amongst industry rivals. In 2006, more than 200 companies took part in the P2P streaming media business; however, in 2008, changes in the diversity of competitors occurred. Several IT leaders survived and seized big slices of the market share; whereas, various medium to small companies were eliminated due to license qualifications, copyright issues, or insufficient capital resources (IT.Sohu.com, 2008).

For instance, Mymate was out of competition because of the financing problem.

Although the total user scale throughout the industry is increasing at a rapid pace, user loyalty is relatively high due to a particular P2P streaming media software. There is only approximately 3% of the audience that have two P2P streaming media platforms in their computers (iUserTracker, 2008). In this rare case, competition is high amongst rivals.

Furthermore, rivals that own more high quality programmes are in an advantageous position that could lead to dominance. Nowadays, programme providers

are in favour of those P2P streaming media operators that have huge end-users, – after all, a bigger audience means a bigger advertising income – but medium to small operators could not attract suppliers unless they set aside more capital to purchase copyrights of content before they win more end-users. This is a vicious cycle as the increase of copyright purchasing results in rising operating costs. Therefore, medium-to-small sized companies could not survive the high industrial competition.

In addition, since P2P streaming media belongs to the high technology sector, in the long run, advanced technology is the key success factor. Other than high quality content, P2P streaming media operators need to make sure that programmes are broadcasting smoothly, without buffering, and at a rapid speed. Thus, updating software is important. For instance, QQLive keeps updating its platform every one or one and a half months to offer better services. UUSee brought out a P2P plus CDN (Content Delivery Network) model which is the biggest P2P video and audio delivering network in China. It enhances UUSee's quality of service.

Finally, the majority of the content on P2P steaming media comes from programme suppliers; therefore, competitors in this industry essentially provide identical products. The industry leaders are quite focussed on how to differentiate their services to

attract a larger audience; however, they really are concerned with trying to provide the latest programme, or taking over the exclusive copyright of a specific TV play or movie.

Currently, competitors compete with each other in programme quality, content, and service rather than simply quantity. Hence, brand identity is a critical factor. High brand identity not only absorbs loyal end-users; but also brings in business opportunities. For instance, PPStream was approved by advertisers and authorities for its famous brand value. At the beginning of 2009, PPStream was honoured “Best 50 Potential Enterprises in China Venture Capital Value List 2008” (PPCN, 2009).

To summarize, competition is high in the P2P streaming media industry. Rivalries should provide exclusive programmes and high quality technology support. If any firm fails at these, then it will not be successful in the industry.

4.2.2 Threat of new entrants

Generally, the threat of new entrants is low-to-medium. Although the application of P2P streaming media technology is easy, other entry barriers, such as business operations, programme copyrights, and government policy, lower the threat from new entrants.

From a technical perspective, to enter into this industry is not difficult. P2P streaming media is one of the applications of P2P technology that has been well developed in China. Because P2P streaming media emerged in the university when it started from scratch in China, there are still many followers of P2P streaming media technology in the university (Hailiang Yang, 2009). Topics about P2P streaming media technology are popular and can be found in many discussion forums on IT-related websites in China. The CEO of PPFilm, Yang, forecasts that although differences between superior and inferior techniques could be represented through the quality of the provided programmes, this gap might be narrowed in the next a couple of years (PPCN, 2009). Hence, any IT company which masters mature P2P technology might enter into this industry.

Nevertheless, superior technique is not enough to survive amongst fierce competition. Regarding business operation and business management, the entry barrier rises to medium-to-high. Apart from the software's technical support, capital requirement is one barrier if an operator aims to be successful. As the programme is free to the audience, operating expenses heavily depend on financing from investors. Thus, one company takes advantage by absorbing considerable investments while another suffers from insufficient financial capital. Since VCs prefer well-known incumbents, it is

generally difficult for a new entrant to attract huge investments in its beginning phase.

PPStream and UUSee are good examples in terms of successful financing that stem from their fame, and helped to confirm their leading positions.

A controversial barrier is the programme copyright that is needed before broadcasting a programme, and without which legal problems might be generated. Copyright is a bottleneck to the developmental progress of p2P streaming media as well because broadcasting rights link huge expense together which new entrants could hardly afford. If they risk running their business while violating copyright regulations, then they face legal repercussions. In fact, even the industry leaders are limited by broadcasting rights, and have been penalised for violations. For instance, PPLive was sentenced with about 85,000 RMB in financial reimbursements to Beijing Megajoy Pictures Inc. for illegally broadcasting five movies in April 2009 (PPCN, 2009). However, programme suppliers, such as TV stations, have preferences for incumbents with which they have already built a long-term relationship. For new potential entrants, copyright increases the entry barrier.

A third barrier is the government policy. In order to run a firm, entrants should first apply for an operating license from the Chinese government, and then entrants are

under the supervision and control of several governmental bureaus. According to PPCN's statistics, only about 70 websites were issued qualified licenses for broadcasting video and audio programmes through the internet by SARFT (PPCN, 2008). That is to say, more than 100 websites are using legal loopholes. As tightened policies are enacted in the future, this barrier will be crucial.

4.2.3 Threat of substitutes

The threat from substitutes is low. There are three types of substitutes: IPTV, video sharing websites and traditional TV programmes. However, the threats from the above three are low because P2P streaming media targets a relatively fixed market segment: audiences who prefer to watch any favourable programme in any place at any time, and most importantly, free of charge. In comparison to P2P streaming media, IPTV charges a monthly fee to its audience; video sharing websites cannot offer plenty of high quality programmes; and traditional TV is not only not free, but it is not flexible in terms of content selection. According to iReserach, a survey was conducted with Chinese internet users about why they chose P2P streaming media in 2006. Table 4-1 lists the percentages of reasons.

Table 4-1 Why Chinese Internet Users Choose P2P Streaming Media in 2006

Percentage	Reason
82.6%	Could watch programmes not available on TV
47.3%	Enjoy the programmes without interruption by family members
43.7%	Could watch live shows
3.6%	Other

Source: Adapted from iResearch (2007)

Audience loyalty to P2P streaming media dilutes the threat of substitutes.

Statistics from AC Nielson China indicate that P2P streaming media, such as PPStream, has above average stickiness (AC Nielson China, 2008). Over 50% of the end-users of PPStream have watched PPStream for more than one year and over 80% of the end-users watch programmes through PPStream at least once a day.

Another market segment lowers the threat as well: the overseas Chinese who cannot watch Chinese TV programmes. For instance, during the 2007 Chinese New Year Eve, more than 160,000 overseas Chinese watched the Spring Festival Gala (a traditional annual TV show celebrating Chinese New Year) through UUSee (Wu Wei, 2007). Moreover, approximately 30% end-users of PPLive are from overseas, which is not a minority considering the quantity of PPLive's usual audience (Jibo Wu, 2007).

4.2.4 Suppliers

Two kinds of suppliers are programme providers and telecommunications providers. Both of their bargaining powers are medium-to-high. As the P2P streaming media industry develops, key success factors are not limited to technology; content and quality of service become critical.

Programme providers are owners who supply high quality visual and audio programmes and have the original signal networks, such as TV Stations (CCTV), Entertainment Corporations (SMG, Inc.), and TV Production Studios (China Tiangong). These suppliers provide programmes together with copyrights to P2P streaming media operators; meanwhile, the latter could offer one more broadcasting method to promote their programmes. If this coalition is in a positive situation, it is considered to be a win-win model for both sides. Indeed, UUSEE seems quite positive and takes pride in its four-year agreement with CCTV (PPCN, 2007). This cooperation not only helps UUSEE to capture a greater number of end-users, but it enables CCTV to broadcast its programmes to areas which do not have cable service. However, a successful cooperative case can bring more attention to copyrights. As discussed previously, the suppliers possess the copyright of the programs. Because products and services are essentially identical amongst competitors, the business that owns the exclusive copyright could win the

market. As another example, PPStream had a record audience of 4.28 million for the Opening Ceremony during the 2008 Beijing Olympic Games (Sina, 2008). Due to the privilege that it bought from the CCTV Network, PPStream dramatically dwarfed other competitors.

On the other hand, this situation in turn increases the suppliers bargaining power. Since programme providers can sell the same program to different buyers, switching the cost of suppliers is low. Additionally, some programme providers, such as CCTV, that own paid online TV networks are vertically integrated (for instance, CCTV has CCTV.com). They are reluctant to sell their programmes or boost the price. Therefore, P2P streaming media operators ought to keep a long-term relationship with suppliers, and seek cooperation and coalition especially with those integrations.

The other supplier is telecommunication operators who provide broadband and network environments to P2P streaming media operators. In China, they are duopolied by China Telecom and China Unicom. Accompanied with the development of P2P technology, the main network of telecommunication providers is becoming busier. Since P2P streaming media relies on telecommunication providers to transit their contents, the relationship between the two parties is crucial. Positive signals from China Telecom and

China Unicom indicate that they are willing to cooperate with P2P streaming media operators (iResearch, 2008). From a technical perspective, they seemingly are considering making P2P applications complementary to CDN (Content Distribution Network).

Furthermore, approvals from telecommunication operators are important to P2P streaming media operators. If the former limits the broadband speed, the quality of programmes will be heavily influenced. Since P2P streaming media could not be broadcast without broadband, a good and long-term relationship with telecommunication providers is a key factor. As a result, the bargaining power from telecommunication provider is medium-to-high.

4.2.5 Buyers

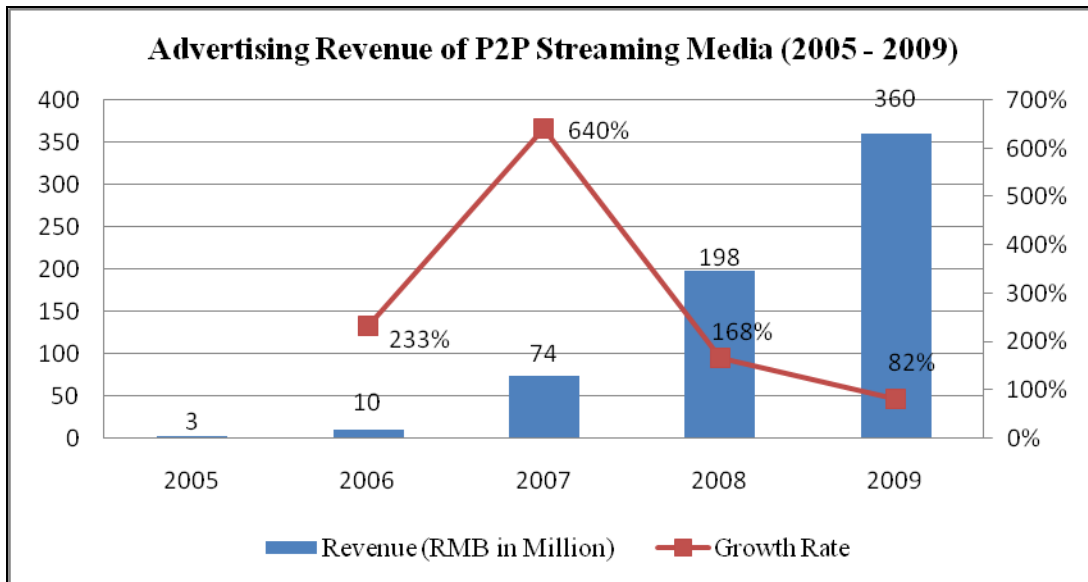
There are two kinds of buyers within the industry. One is the end-user, namely the audience, who purchases the service, in a way, even if there is no fee, or those who take part in the interactive entertainments. The other is the advertiser who buys a virtual online platform to promote its products. Advertisers could be direct advertising clients or any advertisement agencies. Both types of buyer bargaining power are different.

In terms of the audience, they have tremendous bargaining power because their switching costs are extremely low. P2P streaming media software provides end-users with the simplest steps to use the service: they just need to download the software, install it, and then watch the media with the application. As there are various available P2P streaming media software that can be compatible for the same computer, end-users have a choice.

End-users have quite a few choices which stem from the diversity of product providers. They are the most important sources for which P2P streaming media operators are currently competing because a very large audience translates to considerable economic profits. Up until now, to capture more end-users is the fundamental purpose for P2P streaming media operators.

The advertisers have a medium-to-high bargaining power. As a new media approach among the IT industry, P2P streaming media has been attracting investor's attention and the overall tendency of revenue is positive. For example, PPLive earned approximately 40 million RMB of revenue derived from advertisement in 2008 (iResearch, 2009). Figure 4-2 illustrates the advertisement revenue of the P2P streaming media industry from 2005 to 2009. The line shows the growth rate.

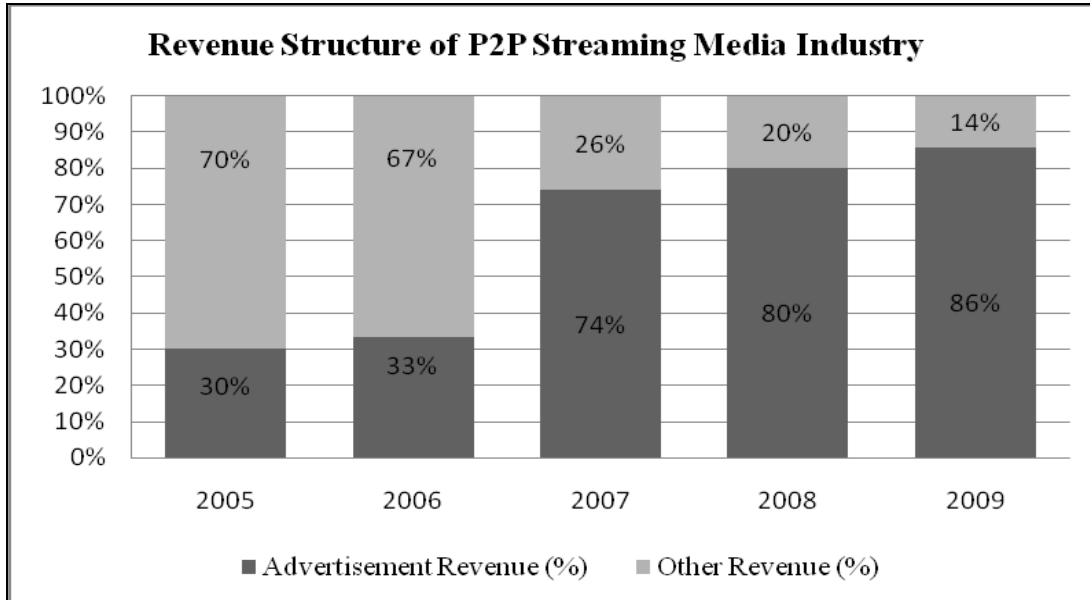
Figure 4-2 Advertising Revenue of P2P Streaming Media (2005 - 2009)



Source: Adapted from iResearch (2008)

Through combining Figure 4-2 and Figure 3-7, Figure 4-3 shows the revenue structure from 2005 to 2009. Other revenues are paid interactive entertainment from participants and technology support from IT companies. While the growing income is a positive signal, it is obvious that P2P streaming media operators depend more heavily on advertisers. For example, the CEO of UUSee, Mr Li, admits that more than 70% of UUSee's total revenue comes from advertisement. The large proportion of advertising revenue increases advertisers' bargaining power.

Figure 4-3 Revenue Structure of P2P Streaming Media Industry



Source: Adapted from the data in the websites CNNIC (2009) and iResearch (2008)

In addition, the switching cost of advertisers is low. There are not many differences in advertising with diverse P2P streaming media operators as long as the operators are industry leaders. Alternatively, advertisers could do promotion through substitute products. All of the above could increase the advertisers' bargaining power.

4.3 Key success factors

Based on the previous Five Forces analysis of the P2P streaming media industry, some key success factors for P2P streaming media operators include:

- a) Technology

Technology is the fundamental element in P2P streaming media. Any operator relies on excellent technology to transit the programmes. Better technique ensures the quality and speed of contents.

b) Exclusive programmes

Since essentially identical services are provided in the industry, P2P streaming media operators need to offer unique programmes in order to attract and seize great number of end-users.

c) Relationship

For incumbents, it is important to build and maintain good and long term relationships with investors, suppliers, and governments. Because potential new entrants could not develop connections all at once, this advantage is obvious.

d) Cooperation and Coalition

To gain an advantage over substitutes, P2P streaming media operators ought to seek opportunities to cooperate and align with suppliers.

It is not easy for a single P2P streaming media operator to possess all of the above key success factors, especially in terms of technology. Even if the top four industry leaders might fail on one or two points, since P2P streaming media belongs to the IT

scope and updates at a rapid speed, neither of the industry leaders own a perfect technology that has high computing processing power, various channel choices and extremely smooth programmes. For medium-to-small sized companies, other than technology, a long-term relationship is even more difficult to build. The following analysis contrasts the top four industry leaders by using the above four criteria.

PPLive

The play speed of programmes on PPLive is fast and smooth; therefore, the image quality is the best. There are plenty of contents available on PPLive even for the latest programmes. Additionally, PPLive has a good relationship with TV stations such as Phoenix TV and Hunan TV, and it owns some exclusive broadcasting rights. For example, PPLive signed a cooperative contact with Hunan TV in 2009, which allows PPLive to broadcast a very in-demand TV show called <Happy Girl Voice> (PPCN, 2009). On the negative side, the channel list on PPLive is overly inconspicuous, and it is inconvenient for users to select programmes. Additionally, the interactions between end-users are not sufficient compared to other operators such as QQLive.

PPStream

PPStream has a great number of high quality programmes due to their good relationship with programme suppliers, notably CCTV (as mentioned earlier in 2008, PPStream owned the broadcasting rights from CCTV for the Beijing Olympic Games). Additionally, since PPStream has good investments from VCs, technology is a strength as it has the funds to invest in R&D. Their unique technology could ensure that an audience of 0.7 million audience was able to watch programmes smoothly at the same time. Within the network system of PPStream, even if only a small amount of data was entered into an internet service provider (ISP), all the other data would be transmitted in the ISP networking. Nevertheless, it is said that although the quality of the programmes is high, the delivery is not always smooth, and sometimes audiences need to wait and buffer the contents.

QQLive

QQLive heavily relies on its website Tencent.com, thus the relationship between other programme suppliers is one of its weaknesses. The contents on QQLive are not too many and few TV programmes are available. Yet, QQLive has integrated its P2P streaming media with chatting software; hence, regarding technology, QQLive owns a unique feature. This also brings in audiences who are QQ users.

UUSee

UUSee has signed an agreement with CCTV in 2006 that enables UUSee to broadcast ten CCTV channels live. Their relationship is good and that good relationship should continue into the future; however, excepting programmes from CCTV, it would be difficult for UUSee could to win a larger audience since they don't have much other content, or varied content, to use. Moreover, its technology is not a strong point when compared with the other three leaders.

As a result, because no operator owns all the success factors, all the P2P streaming media companies are enlarging their advantages and minimizing their weakness. This is why the competition is so high in the industry. Due to the severe competition, it is very conceivable that some operators might be eliminated in the forthcoming years.

5: Competitive Advantages and Impact on Other Industries

5.1 Competitive advantages of P2P streaming media

P2P streaming media should be considered as revolutionary for both P2P technology and mass communications. It brings in challenges to plenty of industries such as traditional media, telecommunications, and the internet (XinHuaNet, 2006). Each end-user is a resource and at the same time an audience. P2P streaming media is steadily introducing an unprecedented cyber network. Compared to other media, P2P streaming media possesses the following competitive advantages:

a) Flexibility

To watch P2P streaming media is not complicated. No extra requirements for computer configuration or broadband are needed. End-users just download the software, install, and watch. Since most of the contents are looped broadcasting, the audience can take much greater advantage of their spare time when watching a programme. During the show, the audience can control the playback (for example, they could pause or stop the programmes at any time). Additionally, some P2P streaming media, like UUSee, provide a search function that enables end-users to search conveniently for key words to help

them find their preferred content. By virtue of this feature, audiences are able to flexibly watch any programme they like.

b) Various video resources

Traditional TV offers limited channels, whereas P2P streaming media owns a database which helps it to broadcast various videos. Commonly a family could receive forty to sixty TV channels in China (Wenming Li, Meng Xia, 2009). P2P streaming media not only can offer TV programmes, but they also offer movies, animations, and over-seas content. Moreover, P2P streaming media categorise the programmes into TV play, movie, entertainment, sports, and cartoons and so on, which satisfies the different audience interests. Take PPStream as an example. There are more than 76,000 videos within 22 categories on PPStream's search list. The huge amount of available information is a key factor that the P2P streaming media use to attract audiences.

c) Free of charge

Another crucial point is the amazing price advantage. In China, the monthly fee for IPTV and cable TV are RMB 70 to 80 and RMB 20 to 30 respectively. Although they are not expensive, they still fail to compete with P2P streaming media. Other than some value-added services which are paid for, all the programmes offered on P2P streaming

media are completely free to the audience. While end-users still need to pay the broadband access fee of about 100 RMB per month, for broadband users, P2P streaming media equals a zero charge service.

d) Interactive communication

P2P streaming media provides programmes to their audience and offers a virtual space where people can share opinions and communicate with each other. The latter is inherited from the internet. It is no longer just a tool of broadcasting. End-users can discuss the contents or chat with cyber friends through BBS (bulletin board services) while watching the programmes. Young people, who are also the main users of P2P streaming media, welcome these interactions. Furthermore, P2P streaming media operators react to feedback. For example, according to the audiences' suggestions, PPLive might change content, update software, or add popular programmes (Wenming Li, Meng Xia, 2009).

e) Tailor-made service

P2P streaming media give tailor-made services to China's younger generations. These people, such as university students, may not often get the chance to watch TV, but the more on-demand functionality of P2P streaming media enables them to watch their

preferred TV contents at their leisure on their own time. Thus, P2P streaming media is their best choice. In addition, some novel functions absorb youth as well. For instance, end-users can record programmes from MPlayer and save them to their computers. The automatic shutdown of the users' computers once the programmes are finished is another feature offered by PPStream. P2P streaming media has unique features that allow it to compete with other industries and draw more end-users' attention. In fact, the growth of P2P streaming media has influenced other media technologies in terms of audience ratings and development.

5.2 Impact on other industries

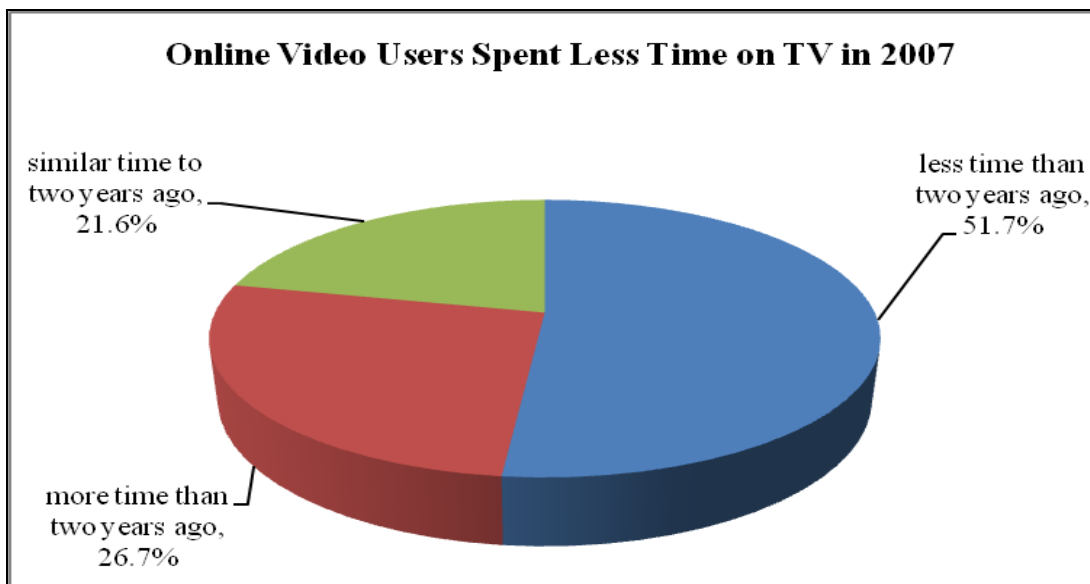
In the computer-centred era, by virtue of its competitive advantages, P2P streaming media has eroded traditional TV. Based on a survey conducted by iUserTracker, the majority of P2P streaming media users are between the ages of 19 and 30, comprising of roughly 60% of the total users (iUserTracker, 2007). This age group depends heavily on the internet; thus they spend fewer hours watching TV.

At the end of 2008, AC Neilson China conducted research on how much time PPStream's audience would spend using its service. The results revealed that over 50% of the audience spent more than 15 hours watching PPStream every week, whereas only

35.1% of the users spent more than 15 hours watching TV each week (AC Nielson China, 2009). It is obvious that users of PPStream spend much more time on PPStream than on TV. P2P streaming media attracts a specific age group. Although traditional TV is still the main entertainment in China,, P2P streaming media's influence is growing and deserves attention.

Figure 5-1 is another research result by iResearch that illustrates that the users of online video spent less time on TV in 2007 (iReserach, 2008). Compared to two years ago, over half of the total admitted to watching more online video than TV programming.

Figure 5-1 Online Video Users Spent Less Time on TV in 2007



Source: Adapted from iResearch (2008)

The progress of P2P streaming media also objectively accelerates the development of some other industries, particularly the telecommunication industry. The technical progress in other industries that P2P streaming media brings about can benefit both the P2P streaming media business as well as the companies it bring those technologies to. For instance, China Telecom and China Unicom put P2P as a complementary to CDN. With the help of P2P technology, the capacity grew from 50,000 users to 100,000 to 200,000 users (PPCN, 2007).

According to the previous analysis, it is reasonable to predict that the P2P streaming media industry has a promising future in China.

5.3 Future trends

P2P streaming media has become increasingly popular in recent years in China. Although it is still a young industry, P2P streaming media offers a great number of business opportunities for investors. The big potential market would undoubtedly result in more competitors even though entering into the industry is not that easy; however, due to operations licences, governmental policy, and copyright problems, some P2P streaming media operators might be eliminated in the future, and the current industry leaders could consolidate their already leading positions.

It is predicted that in the second half of 2009, the P2P streaming media industry will continuously grow in terms of user scale and number, daily download quantity, market size, revenue, and technology support (DCCI, 2008). As a result, its value as an advertising medium would be even more attractive to advertisers. The Beijing Olympic Games, for one, proved that P2P streaming media is a good approach for promotion

Moreover, specialists believe that from a technical perspective, the quality of programmes that P2P streaming media presents has dramatically improved and will be perfected more since P2P streaming media operators will absorb end-users through better technology. This scenario indicates that the audiences' preference has been altered to self-centred entertainment.

It is said that the China National Networking TV Station is under preparation for construction right now. If or when constructed, it would be a TV station which utilises the P2P technology and adopts a similar broadcasting model as P2P streaming media. The TV Station could popularise the P2P technique, and in terms of the industry itself, the potential for improvement is favourable.

In the Web 2.0 era, internet users are not only the receivers of information, but the inventors and transmitters as well. P2P streaming media inherits this self-created, self-

transmitted, and self-consumed spirit to provide an ever-varied video resource. It enriched the contents and types of video information and enabled diversity of programming on the internet. P2P streaming media is based on P2P technology and will surely see much future improvement.

Nonetheless, P2P streaming media industry does not have as long a history in China as in some other countries. Referring to the experience of the P2P streaming media industry in other countries, some problems occurred. Furthermore, the related government policy is still not well equipped to deal with various impediments to the industry. For example, the broadcasting rights issue has accompanied P2P streaming media operators since the industry first emerged, and it is still an issue. In the future, as the regulations are perfected, the P2P streaming media industry will be restructured. As the CEO of PPLive, Mr. Yao, predicted, the competition will be more severe in the next couple of years (PPCN, 2008).

6: Problems in the Development of the P2P Streaming Media Industry

The P2P streaming media industry faces some problems with its rapid development. Like other industries, these bottlenecks are inevitable. It is positive that many P2P streaming media operators, especially the industry leaders, have realized the problem. Thus, only when the appropriate solutions can be found can the P2P streaming media industry develop healthily.

6.1 Copyrights of the contents

Copyrights of the contents have been the main problem accompanied with every development phase of P2P streaming media in China. With the advanced P2P technology, it is feasible to “paste” programmes on a network through re-encoding without any difficulties (Wenming Li, Meng Xia, 2009). By virtue of this convenience, audiences from all over the world could watch these diverse programmes on the internet. For instance, CCTV is the most competent TV station in China, but it still could not afford all the broadcasting rights for the NBA or bring in the latest Hollywood movies, let alone

other TV stations or media companies. Hence, some P2P streaming media operators take risks in order to broadcast programmes without copyrights.

Nevertheless, copyright is the key point in determining the life cycle of P2P streaming media operators. The audiences attracted by the broadcasting of pirate programmes are, in essence loyal to the contents, but not to the operators. A lot of P2P streaming media operators are proud of themselves for providing free online programmes. At the beginning of 2007, PPLive was forced to stop broadcasting the US TV play <Prison Break>. PPStream also admitted that it had used pirated content before (Tongxiang Cai, 2007). Therefore, in regards to the long-term development of the industry, ensuring authorized copyright seems crucial and it should be a prerequisite for delivering contents to an audience.

Furthermore, pirate programmes sometimes result in legal cases which always bring about financial losses. For instance, in October 2008, Mega Joy Beijing accused PPLive of illegally broadcasting five movies which exclusively belong to Mega Joy Inc. Finally, PPLive was charged more than RMB 80,000 and forced to stop broadcasting without copyright (PPCN, 2009). It is not hard to deduce that even for the industry leaders, such as PPLive, they cannot get away with pirated contents. Although the fine

was not huge, the lost lawsuit reminded all P2P streaming media operators that pirated contents should not be the essential competitive forces.

Thus, if P2P streaming operators cannot overcome the obstacles associated with copyright, their future development will be heavily limited. Since differences between the levels of P2P streaming media technology are not the key points in determining competitive outcomes, authorized copyright will be the major factor in influencing market competitive forces for P2P streaming media operators in the future.

6.2 Over-dependent on others

On the one hand, P2P streaming media operators rely notably on programme suppliers. Restricted by copyright, operators need supply from other contents makers. Currently, only a minority of the programmes are from the P2P streaming media operators themselves. The main resources are still purchased. For example, UUSee has a four years' contract with CCTV to broadcast more than ten channels from CCTV. Although this resolves the copyright problem, it increases CCTV's power, and from UUSee's perspective, it certainly increases its dependency. As a result, in terms of content, the operators are dependent.

On the other hand, revenue is not multiplied and mainly stems from advertising. As introduced in Chapter 3, over 75% of the total revenue of P2P streaming media comes from advertisement, and this percentage will increase in the future (iResearch, 2008). Hence, it is apparent that P2P streaming media operators have not figured out the true access to profit model. Before the industry becomes mature, advertising will be the life-saving straw for operators, and this model is reasonable because it is the simplest way to earn profit.

However, over-dependence will not only raise the bargaining power of advertisers, but it also will limit the P2P streaming media operators' power of income. Since currently the profit mode has not cleared, operators still have opportunities to find other methods, such as value-added interactions and technology support.

6.3 Government policy

While P2P streaming media has grown dramatically over the past years in China, government policy is lagging behind. This has caused disorder in management and development within the P2P streaming media itself. Due to the relatively lower entry barriers and severer competition, some operators attract an audience by providing

fictitious introductions for, and descriptions of, the programmes. The most common bait is to use the word “pornographic”.

Due to the lack of content control, the overall programmes are not first rate. This heavily influences the transition of online video and dramatically damages the company images of the related P2P streaming media operators (Wenming Li, Meng Xia, 2009). Even if the internet is a free broadcasting carrier that offers diverse programmes to satisfy different audiences, any content it delivers ought to obey legislations and should be under the control of government departments.

Up until the first half of 2009, there are still no specific policies or regulations for controlling P2P streaming media; however, SARFT had attempted to rectify the P2P market in 2006 (PPCN, 2007). Moreover,, in May 2009, SARFT made another round rectification by ending illegally broadcasting programmes online. P2P streaming media operators are the targets. In the future, SARFT will improve the regulations in managing and standardizing the P2P streaming media industry. Legal P2P streaming media will be required to own licence, and it is believed that detailed laws will be issued in the future (LMTW, 2009).

6.4 Relationship with telecommunication operators

The attitude from telecommunication operators is crucial to P2P streaming media. Although there have been positive signals, telecommunication operators still have not shown a definite attitude. The P2P streaming media technique mitigates the pressure of broadband derived from online video operators, but it generates conflict when it comes to the financial benefit with telecommunication operators. This is because a partial P2P streaming media technique could not resolve the occupation of the entire resources of a telecommunication's main network (CEO of PPLive, Yao, 2007). Hence, with regard to telecommunication operators, on the one hand they will take the responsibility of internet traffic, but on the other hand they could not gain financial benefits.

Nowadays, telecommunication operators are working on policies specific to P2P technology (LMTW, 2009). P2P has not been forbidden entirely by telecommunication operators, so in order to dispel their misgivings, P2P streaming media operators should meet the required standards on a technical level that are conducive to a mutually beneficial relationship. Telecommunication operators require P2P streaming media companies to achieve a standard which is controllable and manageable in terms of technology (iResearch, 2008).

6.5 Below-average audience stickiness

Except for the industry leaders such as PPLive and PPStream, other medium-to-small sized P2P streaming media operators have trouble in maintaining audiences. Due to the P2P technique, end-users download and install software free of charge. Because of this convenience, if someone is not interested in the programmes of one operator, that person can easily move to other software with almost zero switching cost.

Compared with other industries, P2P streaming media itself does not have high audience stickiness. After all, the quality of programmes is the critical point in absorbing and maintaining an audience. This brings it back to the copyright issue. A successful P2P streaming media operator ought to find a way to balance these topics and survive in the industrial competition.

6.6 Technology

In accordance with Yao, the CEO of PPLive, in the early period the P2P technique was not mature and sometimes the system broke down every one or two months.

Although recently P2P streaming media technology has seen rapid development, there is still space for potential progress.

Buffering is one problem on a technical level. When the internet speed fails to cope with the requirements, online programmes cannot be broadcast smoothly. The audience needs to wait for a while until the contents are completely buffered down. Yet, in this respect, the industry leaders win competitive advantages through sufficient capital support and operating experience.

Another technical problem involves occupying the system resources on the end users' side. P2P streaming media software saves data and code into the computer memory at the end-user's computer (LMTW, 2005). It takes up part of the computer memory. Therefore, when watching programmes, it might generate some problems for those end-users who have a lower computer configuration. Improvements need to be made to offer better quality to audiences.

6.7 Security

In a P2P network, the end-users go in and out without restriction; therefore, it raises security problem for the entire P2P network. Cheat and pretend might occur because all the data are exchanging amongst users. In essence, a P2P network is a self-rule network where each node joins in, logs on, searches, and asks for resources without

the participation of a central server (IPTVWorld.Net, 2006). This feature reduces the operating cost of the main network server.

The P2P streaming media operator usually has trouble in managing the whole network as well as every single node (IPTVWorld, 2006). This not only potentially does harm to end-users, but it also threatens the P2P streaming media operators. Operators should consider how to balance operating costs and security.

6.8 Summary

In sum, during the rapid growth of the P2P streaming media industry, problems occur which accompany the developmental progress. The operators need to figure out solutions to these bottlenecks in order to maintain a leading position in the industry.

Considering the entire industry, solving these problems is also a good opportunity in its future development.

7: Recommendations

Online video, which is already popular, is gaining popularity on the internet. Like TV relative to magazines, video's combination of words, sounds, and pictures have huge advantages in getting a message across and for entertainment purposes. The P2P technique can connect with other nodes in the network which dramatically increases download speed and the utilization ratio of the internet (Tongxiang Cai, 2007). This is also the main strength of P2P streaming media. It is believed that P2P streaming media will be an important direction in the development of online video.

For future progress, here are several recommendations for P2P streaming media operators:

7.1 Legal copyrights

Since pirate programmes are the main problem facing P2P streaming media operators, an operator's business competence is measured by the ability to solve the copyright problem. It is obvious that an exclusive copyright needs considerable capital to purchase. For industry leaders who obtain positive financing, the purchasing fee might

not be a problem; however, in terms of medium-to-small sized operators, sufficient financing is the basic obstacle to buying copyright.

Copyrights might include TV programmes from TV stations, hit shows or movies from production studios, or popular events from provincial TV stations. Since TV stations prefer media operators with a long-term relationship, it is easier for industry leaders to purchase broadcasting copyrights from TV stations. For instance, PPStream owned the rights to broadcast a very popular singing competition from Hunan TV in both 2008 and 2009. By virtue of the financial advantage, industry leaders could also buy other types of contents from production studios.

For medium-to-small companies, since their company brands are not their strengths, it is better to purchase contents from film studios in order to win legal and exclusive copyrights.

In addition, except copyright purchase, a better solution for medium-to-small sized operators involves focusing on some details when signing the agreement. For instance, China InterActive Corp (CIAC) put copyrights of advertisement, wireless, and payment separately. The CEO of CIAC, Chen, said that they only focus on the copyright

with a specific beneficial future. Because a patent fee is too expensive for them, CIAC would not purchase blindly (XinHuaNet, 2006).

Overall, possessing legal copyright should be the long-term business strategy for P2P streaming media operators. Pirated contents are just a temporary method to absorb audiences. When government regulations are successfully implemented, authorized operators will be the long-term winners.

7.2 High-quality programmes

The CEO of PPStream, Xu, ranks content as the first core successful factor for P2P streaming media operators (PPCN, 2007). Although P2P streaming media will continue to be subservient to the development and implementation of technology, the quality of the programmes (and not just the means of delivery) will play an important role in the intensive competition. Using the popular America's Got Talent as an example, audiences watch NBC because of the programme, rather than they like NBC and so they watch America's Got Talent.

High-quality programmes, in this sense, refer to either hit TV shows, movies or contents with exclusive broadcasting rights. P2P streaming media companies need to build up a market team that understands audiences' preferences in order to purchase the

most attractive programmes. The partnership with programme suppliers is powerful at this point since suppliers, such as TV stations, own the contents. Especially when it comes to a long-term favourable relationship, programme suppliers are willing to cooperate with big firms.

In the future, P2P streaming media operators are no longer just IT companies, they also belong to the mass media. Therefore, competitors should succeed by offering high-quality programmes.

7.3 Independent business

Another way to win business is through original programmes. Other rivals might also purchase contents from suppliers; thus, some competent P2P streaming media operators could produce their own programmes. This not only solves the pirate issue, but it also decreases the operating cost derived from purchasing copyright. P2P streaming media operators could consider collecting original ideas from internet users as users are a vast internet resource, and this has the added bonus of generating more consumer loyalty and interest.

Since 2006, Rox Media System (RMS, whose predecessor is CoolStreaming) has built up its own professional team for producing programmes. The famous show

<Entertainment Star> is welcomed by internet users. The CEO of RMS Lv said that the company would endeavour to produce more novel types of content, such as a cyber movie (LMTW, 2008).

However, this strategy is not appropriate for all P2P streaming media operators, and, in particular, the industry leaders because they already have programme resources and it is risky for them to set up a new business model. The cost for arranging the new team might not compensate for the income derived from unique contents. And as they already have built good networking with programme suppliers, they should focus their advantages.

Although P2P streaming media operators could not rely on independent business completely, original programmes indicate a prosperous direction for future development all the same.

7.4 Collaboration with TV station

Collaborating with TV stations is an apparent approach for P2P Streaming Media to capture the market. The CEO of UUSee, Li, considers P2P streaming media as a value-added service to traditional TV stations. Based on a survey by AC Neilson China, the overlap between the PC audience and the traditional TV audience is quite small (LMTW,

2009). In other words, people who always surf online might not watch TV, and vice versa.

Accordingly, P2P streaming media augments the coverage rate of a TV station and increases the audience of TV stations through the internet. As a win-win strategy, it is believed to be the most crucial reason why a TV station would like to collaborate with P2P streaming media operators.

The recommendation is that P2P streaming media operators might collaborate with TV stations by negotiating with the copyright purchasing fee. Earned profit could be divided after enlarging the market share. Because the content supplier's bargaining power is not low, this strategy is appropriate for large enterprises like industry leaders. As illustrated in former discussion, TV stations always select a long-term partnership; therefore, it is not easy for medium-to-small sized companies to build connections with TV stations all at once. They might consider other strategies.

7.5 Diverse income resources

Because a large proportion of the revenue comes from advertising, P2P streaming media operators need to come up with other ways to diversity their income resources. This will not only increase revenue, but it will decrease their reliance upon advertisers.

The method with the most potential is, like several industry leaders did, using paid interactive communications.

According to the CEO of PPStream, Xu, PPStream owns a dummy online community that has approximately five million registered members. It is the largest interactive communication community for movie and TV play in China. At the same time, PPStream provides an information platform that encourages participants to exchange ideas through mobile phone message. Thus, PPStream could share telecommunication fees with telecommunication operators (LMTW, 2009).

Though this would merely be a supplemental profit, and the revenue from advertisement would still make up for the largest percentage of profit, it would generate another possible business model for P2P streaming media operators.

7.6 Integrate more services

In order to promote themselves, P2P streaming media operators could add more by-services. Since the internet is an open platform, it is well known that information is transmitted extremely fast. Connections between IT products are strong. Other online activities could help P2P streaming media to establish brand images and to expand their

popularity. Consequently, a successful by-service is able to attract new end-users and hold the existing audience.

One typical case is Tencent, which integrates its website (QQ.com), chatting tool (QQ), and P2P streaming media (QQLive) together. It is said that QQLive does not earn much profit (LMTW, 2008); however, concerning end-user stickiness, Tencent is successful because the integration helps it to build up a group of loyal customers. These reliable users also stimulate the growth of each of the products.

Another possible by-service is online games, which is particularly popular amongst young internet users in China. Based on CNNIC, there were about 55.5 million online games users by the first quarter of 2009 (CNNIC, 2009). It is a good opportunity for P2P streaming media operators to seize these users as their potential audience.

7.7 Summary

The P2P streaming media industry has formed a product chain as the main business model. Although the fundamental operation mode might not be changed, operators could figure out outlets through other methods. The competition is connected to many aspects of the business. No one company could survive with a single advantage alone, therefore, ultimately, a successful P2P streaming media operator should know

how to balance its capabilities between technology, end-users, capital and programme

contents.

8: Conclusion

Based on the previous analysis, the development of P2P streaming media has thriving by taking advantage of existing P2P technology. In China, it is quite popular amongst internet users and especially the young generation. After four or five years' growth, it is expected that the P2P streaming media industry will become mature and healthy.

Currently, several leading operators capture this industry; however, there are many incumbents of various sizes participating in the business. Although to enter into P2P streaming media the competition is not difficult on a technical level, in terms of financial support, programme supply, government regulations, and audience approval, one company could not survive solely through technology. Thus, a successful P2P streaming media operator ought to be able to master and balance all the factors which determine ultimate success.

In addition, many bottlenecks accompany the development of P2P streaming media. Since this industry grew rapidly, related legislations are not well equipped yet.

The Chinese government is paying more attention to P2P streaming media, and the associated regulations are under formulation. As the policy tightens, the P2P streaming media industry would be reorganized.

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