

# Research and analysis of browser games

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**Abstract.** In 1987, the first video game was published. People entered a new world to explore gaming. After ten years, browser games were invented. In order to deeply discuss browser games' future, this article summarizes the features and current situation of browser games. This article analyzes the strengthens of browser games in three aspects, which are convenient setup for players to start the game, social interaction for players to interact with other people, and free-to-play experience provided for players. The analysis of browser games' weaknesses is included in this article as well, which were the potential factors that lead browser games to current situation. The weaknesses are browser games' low quality of display and the dependencies of the internet. Also, this article analyzes the reasons why the revenue of browser games reduced, which are related to the presence of mobile games, the reduction of funding, and the stopped service of Adobe Flash player. In conclusion, the full article and the future development of browser games were concluded.

**Keywords:** browser game, strengthens, weaknesses, revenue.

## 1. Introduction

In 1987, a digital game called Spacewar! was published [1]. Since then, people have had the access to understand the world of digital games. Gradually, digital games became a part of people's life, especially for young people. Digital games exist in several ways, such as the video game on the computer and the game machine in the game hall. To attract more people, the game industry creates diversified genres of game, for providing more options to gamers. In 1996, Earth: 2025, the first browser game in the world was published [2]. The browser game became a trend of digital games for gamers, because it is easier to run browser games than video games on their device. Basically, Adobe Flash is the only required software to run any browser games [3]. Which means gamers do not need to download the software every time to play a browser game. By contrast, video games need more time to set up the gameplay, since gamers must download the disk software for every single game.

In the 2000s, browser games reached mainstream popularity in the world of digital games. Adobe Flash gave the permission to the users and allowed them to develop the flash games. However, the blossoming of browser games was short-lived. Along with the emergence of mobile games, which provide a more convenient way for gamers to play, browser games were separated from the mainstream

of video games. Although browser games are already out of the gamer's sight, they still exist in the gaming world. It makes people curious about the development tendency of browser games.

Since browser games are one of the most popular types in game history, learning the past and the future of browser games could be helpful to understand the development of digital games. In the field of video games, the overall study of browser games is not comprehensive enough for now. That's why it is necessary to do further research. This article is going to analyze the current situation of browser games and predict the future of browser games based on the research results. In the first part, the article introduces the strengthens of browser games. Including the setup of browser games is convenient to players, the social interaction that browser games provide for players, and the free-to-play experience that players could get by playing browser games. In the second part, the article presents the weaknesses of browser games. Including browser games' low quality of display and the dependencies of the internet. In the third part, the article analyzes the reasons why the revenue of browser games reduced. Including the presence of mobile games, the dwindling supply chain of browser games, and the stopped service of Adobe Flash player. The last part of the article concludes the full article and the future development of browser games.

## 2. The strengthens of browser games

### 2.1. Convenient setup

In the early days, when browser games were on the trend, their unique features should not be overlooked, especially installation. Unlike traditional video games, which need software installation to run the gameplay, browser games only need a plugin player to load the game. Also, plugin player is commonly used for each browser game, which means gamers could use one plugin player to numerous games. One of the most famous plugin players was Adobe Flash player. Adobe Flash player provides the combination between animation and programming [4]. Many game designers use Adobe Flash player to create a game because it can run graphics on different operating systems, which supports the designers to create the game in a flexible way. Papa Louie Arcade is a series of simulation games. Player is going to play a role as a server in the diversified food stores, such as pizza store and cupcake store. In the game, player needs to confirm orders, make food, and serve dishes to customers. Earning money and tips will be the main goals. Papa's Cupcakeria is one of the rank topped games under Papa Louie Arcade series, which is showed in figure 1. In the game, player needs to make cupcakes for customer. The decoration of cupcake is one of the most important factors to get higher tips as well. Many people enjoyed the games under Papa Louie Arcade series when they were in childhood [5]. Facing different customers and making different foods became the reasons that Papa Louie Arcade games are addictive. Therefore, the convenient setup of browser games makes them fascinate to players.



Figure 1. A picture of gameplay of Papa's Cupcakeria [5].

## 2.2. Social interaction

Except for the convenient installation for gamers, browser games provide social media the opportunity to attract users. As a type of game that allows gamers to play on the browser, it suits social media perfectly. FarmVille, a farm-simulation game developed by Zynga, was published on Facebook in 2009 [5]. In the game, each player owns a plot of land, shown as figure 2. They need to do implantation, harvest, and grazing to reach game goals. Other than basic single player browser games, FarmVille allowed players to add friends and visit friends' farms on the platform, which increased interaction into player's playing experience. In the game, players can add other players as their neighbors. When they run out of the materials that they need to feed their animals, they could visit their neighbors to ask for some water or crops. Also, they are allowed to send gifts to their friends in the game, even though the gifts are virtual. This fascinating feature generated a lot of interest from people outside of Facebook and the gaming world. At the end of 2009, the number of players of FarmVille had exceeded 72 million [5]. FarmVille provided players novel experiences by simple game mechanics and online social interaction, and it became the most famous game at that time. In 2010, there was even a case of a council chair being fired because he was addicted to FarmVille during working hours [6]. After seeing the popularity of FarmVille, Facebook published other browser games for users to play, such as 8 Ball Pool and Candy Crush Saga. In general, the ability of keeping players in the game of browser games is not as strong as video games, because browser games provide less complicated mechanics and randomized goals for gameplay. But undeniably, browser games brought the highest number of users to social media at its peak.



**Figure 2.** The first version of FarmVille (2009) [5].

## 2.3. Free-to-play

Moreover, browser games usually provide free-to-play experience to gamers, while video games always charge gamers a not cheap price. In 1996, the year that the first browser game was released, the regular price of a disc-based game was \$59.99 or more [7]. Converting to 2020 dollars, the regular price of a disc-based game in the early 2000s would be \$100 [7]. By contrast, browser games were much cheaper than video games in the game market, because they mostly charged no money from consumers.

How could game developers make money by making browser games? Gamers are often curious about the ways of making profits by developing browser games. In fact, microtransactions are the most common way to make money in the game [8]. Game designers put the fascinating elements such as skin and power-ups in the game to attract players paying money to get more benefits. Hero Wars is an online role-playing game. In the game, player needs to team their characters up to slay enemies. Also, player should level up their characters in order to defeat higher-level enemies. As a browser game, Hero Wars

provides free gameplay to players. At the same time, Hero Wars creates microtransaction paths for players to strengthen their heroes, such as making them more powerful (Figure 3).



Figure 3. Microtransaction in Hero Wars [7].

### 3. The weaknesses of browser games

#### 3.1. Low quality

Because of the less restriction in Client games than browser games, which includes the size of the resources such as models, textures, animations and sounds that are loaded by the game to make the players better experiences, the access to computer resources and peripheral, Client games can attend to high quality of graphic, sound and vibration, because the software helps them to render high quality of the resources. By contrast, browser games usually have simple software that could only provide low quality of the resources.

For example, in 2006, there was a browser game called McDonald's Video Game that was published [9]. It's a stimulation game about McDonald's (Figure 4). In the game, players need to operate the McDonald's company to get profits by raising cattle, distributing staff, and selling burgers. Once the company reaches a heavy loss, the game ends. Players usually experienced an interesting and hurried gameplay when they noticed the revenue was decreasing.



Figure 4. A picture of gameplay of McDonald's Video Game [9].



In the same year, Call of Duty 3 was published [10]. Call of Duty is a first-person shooter game, and the story background is based on World War II [10]. Basically, player needs to attack and hide to reach the game goal. It was released for several visual consoles such as PS2 and Xbox. Compared with the two, Call of Duty 3 provides higher quality of resources to player than McDonald's Video Game does, including graphics and sound. Although McDonald's Video Game and Call of Duty 3 were both developed in 2006, the gap between their quality was still obvious (Figure 5).



**Figure 5.** A picture of gameplay of Call of Duty 3 [10].

### 3.2. Rely on the internet

Indeed, browser games allow gamers to play without tedious installing process, so gamers could easily get into gameplay process in a short time. However, when the internet that supports browser games is unstable, then the gameplay would be unstable as well. On the other hand, the console game, which needs disk installation, does not rely on the internet once it has finished downloading.

For instance, one of the differences between Super Mario 63 and Super Mario 64 was based on their access. Super Mario 63 is an unofficial fan made browser game created by Runouw using Adobe Flash player (Figure 6) [11]. Super Mario 63 was released in 2009, inspired by the Nintendo's official game named Super Mario 64 published in 1996. Although it was a fan-game, Super Mario 63 was still popular during the period that browser games reached mainstream popularity in the game world. In the game community, some people said Super Mario 63 was one of the impressive games in their childhood. Compare to Super Mario 64, the video game on virtual console platform, the main weakness of Super Mario 63 was dependency on the internet. With no internet connection, in these two games, gamers had to choose Super Mario 64 between these two games, because Super Mario 63 could not be played under the situation without the internet.



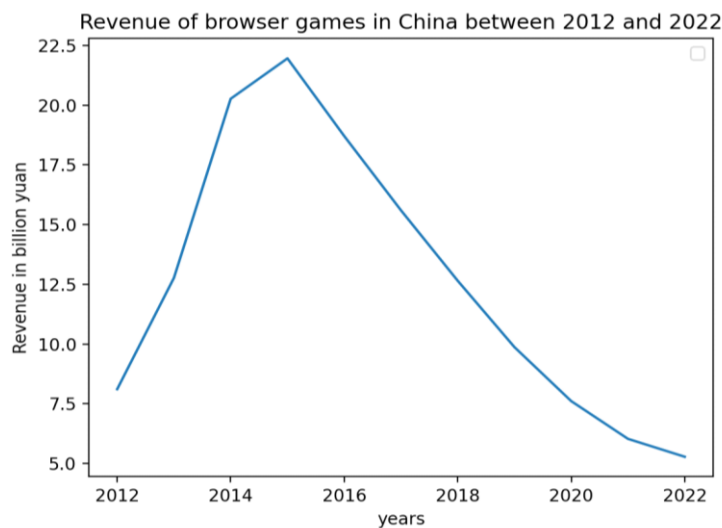
**Figure 6.** A picture of gameplay of Super Mario 63 [11].

#### 4. Status quo: earning declined

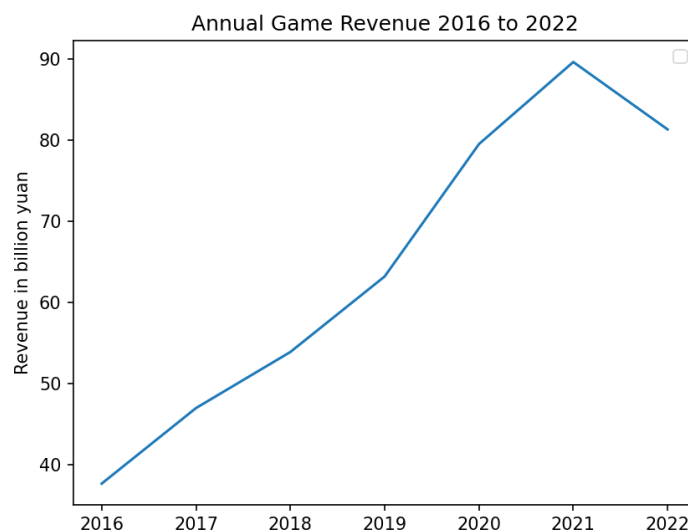
In the following section, this article will discuss the current state of web games and analyze the reasons for this.

##### 4.1. Influenced by mobile games

To analyze the condition of a certain industry, focusing on the revenue it can bring can be important in an enterprise's perspective which influences the future investments on this industry and can conclude the users' attitude towards this kind of game. According to Figure 7, the revenue before 2015 is continued increasing. However, the revenue kept decreasing and reached the lowest point in 2022 during the ten years due to the explosive development in mobile games. Compare to the trend in mobile games and console games in the same years according to Figure 8, which are on the upward trend, the browser games are shown less interested by entrepreneurs. This also can reflect to the situation in this industry as the main purpose of the company is to gain as much profit as possible.



**Figure 7.** Browser game revenue in China from 1st half 2012 to 1st half 2022.



**Figure 8.** Annual Game Revenue 2016 to 2022.

#### *4.2. Reduced investment*

The dwindling supply chain of web games is mainly influenced by the development of PC and mobile games, and most entrepreneurs prefer to invest in these projects. This reduced funding chain affects the speed and quality of web game update iterations, making it no longer competitive with PC games and mobile games, which is another reason for its failure.

So that the games need to be updated often to maintain the users' preferences and to compete with the competing companies that try to change the tastes of players. The graph shows the user of mobile games and console games which are keep increasing and dominant the market. Compare to them, browser games show less influential in the game market, and have already substitute by mobile games and console games. To conclude, user's interests on browser games are keep decreasing, which means browser games' times are ended. Companies will no longer enhance the investment in browser games. Players are tending to play mobile games.

#### *4.3. Flash player stopped updating*

On 31st of December of 2020, Adobe flash player stopped its service on Internet browsers. As a cause of lack of security, not compatible both PC and mobile. The leave of flash player left a gap for many games to transfer into HTML5 and JavaScript. During this, many users were lost.

Flash player is defined as a platform that supports multimedia that allows developers to add, remove and edit animations, videos that can be interact with users. Its applications mostly cover online gaming, advertisement and video playback. Flash player has advantages in compatibility among different computers and web browsers and the vector0-base system of disposing images allows the incorporation of bitmaps and small size of the software. It once used to replace html elements on webpages. However, the disadvantages of Flash players lead to the replacement by Html5 media and let the mobile games have an opportunity to develop. Most mobile devices do not support Flash Player that most browser games cannot load by mobile devices, which causes another new opportunity for mobile gamers to play mobile games rather than browser games. But Flash Player have security flaws that let attackers easily to track the players' path and gain information. That is one of the main reasons that leads to the abandon of Flash Player.

There are plenty of websites used for arcade that contain various kinds of browser games. In China, the most famous one is called 4399. The platform mainly contains games that requires the support of flash player that can show the game images and videos correctly. However, after the unsupported Flash player among many prevail web browsers, the games in these websites need a transaction between Flash player and Html5. But this takes time, in players perspective, once a website that are not available for playing games, they may never play games on that website again, instead, they will turn to play mobile games or any other games. Also, this became a great shock to many game industries. Once they realize the information of Flash Player will no longer be supported, the investment on these products will be reduced, that results in bad quality of browser games and leave a bad impression to players. From then on, the website may be forgotten, and browser games will never be played. The transfer made a gap for users transfer into mobile games and PC games and a great shock to browser games companies.

### **5. Conclusion**

This article analyzes the current situation of web games in detail, discusses their advantages and disadvantages, and analyzes the reason for the decline in profit. In conclusion, the browser game is a kind of game that were dominant the main stream of the game industry during the past twenty years. It has advantage in the conveniency of installation, providing social opportunities to attract players, free-to-play experiences. Adobe Flash Player make users easily access into the game. However, due to the rise of mobile games and console games, the banned of Flash Player in most of the website browsers, and the decreasing in profit, browser games are facing a harsh time. The revenue made by browser games was keep decreasing that reach the history lowest, that causes a vicious cycle that the quality and the content of the game would not be improved. Browser games have no competitive advantage among other games and will quickly leave the game market. Browser games are substituting by mobile games

and the console games due to the more social opportunities provided in mobile games and the better quality of the console games. In the near future, the browser game will focus on cross-platform and the improvement of its quality to make an advantage among mobile games and the console games. However, the subtle improvement will not work well. In future, browser game will focus on cross-platform, legal edition, and the improvement in quality.

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