

Financial projection and monetization for a Free-to-Play Game

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This thesis is written as a project for a commissioning company. As the company is producing an online game for smartphones, there is a need for financial projections and calculations to show if the game is as profitable as expected or not.

The theoretical basis for this task is the accounting knowledge the author has acquired during the studies. The research method for this study is qualitative research using primary and secondary data.

The thesis's tasks include the search for information related to free-to-play games, financial targets chosen and calculations for numbers of users, costs, payback period and pricing for the game.

The main outcome of this thesis is an Excel template for the company. The calculations show that the game is profitable and all the goals set are realistic; therefore, it is worth producing the game.

As the game production is just at the beginning stage, all the numbers for calculations are predictions. Therefore, it is recommended that after the soft launch, the company can base on the customers' reactions and modify the calculations if needed.

Keywords: Monetization, free-to-play game, payback period.

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1 Introduction

Financial projection plays an important role in all companies. For the management teams and the investors, it is important to know the possible revenue that a project can bring before starting to work on it. For startup companies who just begins to produce a game for smart phones, financial forecast for the project is very challenging but crucial, especially when the production cost is high and the time spent on it is really a lot. In addition to that, as the company expects that the game will last and still be profitable after several years from the launching day and there will be some other streams of revenue beside the main one, it is seen that the prediction of revenue is really important. Therefore, this thesis will be done as a project, which meets the need of financial projection for a specific project for start-up company in the gaming industry. In this chapter, an overview about the case company, their needs, the parties benefited, project objectives and tasks and international aspects will be discussed.

1.1 Background

The thesis idea was born after the idea of producing a new game for smart phone, using free-to-play model. As the company is planning to produce the game, there is a need for financial projection to control the revenue of the game. Therefore, the role of this thesis is to calculate the possible revenue of the game for the company. In the future, when the company starts to produce more game using the free to play model, this financial projection, hopefully, will still be used as a template or a reference.

The thesis project is a challenge for the writer, as the concept free to play game is a new topic. All the numbers and method to calculate need to be investigated and started from the very beginning. However, this is a chance to apply the theory into reality, to see how the financial project happens in real life and how useful it is for the company.

1.2 Project objective

The project objective can be defined as the monetization model for a free to play game for smart phones. In order to achieve the objectives, there are six projects tasks (PT) as follows:

Project Task (PT)	Theoretical Framework	Project Implementation Methods	Outcomes
Investigation of factors that affects the free to play model	Financial projection, factors for free to play model	Desktop studies	Crucial factors that affects the free to play model
Financial and other	Financial projection,	Desktop studies and	Realistic targets to be

targets of the game	revenue, expenses and payback period	discussion with the company related to targets	set
Project calculations: spenders, marketing costs, payback period and mechanism for the game Other ideas for new streams of revenue	Monetary in game	Discussion and calculation to get the number	Calculations' results. Other possible streams of revenue
Presentation of the result and evaluation		Presentation to the company	Outcomes and feedback

Table 1: Overlay matrix

1.3 Project scope

The main purpose of this thesis is to provide the financial projection for the game of the company and design the mechanism for monetary in the game. The outcome of this thesis is to provide the company with the financial forecast and possible suggestions on how and where to improve the games to get higher profit.

In 2017, the target of the company is to produce the game and launch it in Germany. In the future, the company expects to globalize the games in other countries with several streams of revenues and in different languages for users in different countries. In this thesis, the possible issues about expenses when globalizing the games will be briefly mentioned. There will not be any deep analysis and calculation regarding this issue covered in this thesis. To be clearer, this thesis, for example, will mention the possible expenses when bring the games to other markets but will not go into details the calculation of those possible expenses for those markets. The reason is because at this stage, it is too early to globalize the game and there is not enough information and tests regarding how the game can make money and if the game is profitable enough and if it is worth bringing the game worldwide.

1.4 International aspect

At the moment, the company's market is only Germany. In the future, the company expects to go global. Therefore, there will be some issues overall to be considered, regarding the accounting and financing as well as the business strategy and business model to reach the cus-

tomers. At that point, it is recommended that the company employs foreign people coming from the countries where the company has the markets.

1.5 Benefits

As the thesis is done as a project for a start-up company, there will be mainly two parties benefitted from the thesis. From the company viewpoint, this thesis outcome is expected to give the company a clear picture about possible revenue of the new product and if it is worth starting producing it.

This thesis truly brings opportunities and challenges for the author. This is a chance for the author to work with the company in the game industry from the beginning of planning a games till production and apply the accounting knowledge of financial projection from school into reality. Should the outcome of the thesis is useful and applicable; the participation in other game projects in the company in the future is possible for the author.

Finally, for students who read the thesis, it is expected that the thesis can bring an idea of free to play model game and possible way to project the revenue and design the mechanism in the game to attract the customers and bring the revenue to the company.

1.6 Key concepts

Definitions of important terms used in this thesis will be given clearly; to guarantee that all the terms are understood correctly by the company and other random readers who may not be familiar with free to play model game and accounting languages. Those terms include pay-back period, pricing per user and other terms that are crucial for free to play game.

1.7 Case company

The company was established in 2010 by 2 professors in Germany and based in Germany. The company has 2 offices in Berlin and Halle. At the moment, the company has about 26 employees.

The main product provided is the technology that allows everyone to write the own games without using any knowledge of coding and designing games. The other products of the company are made as projects, and one of them is the free to play game for phones. The potential customers of the company are various, depending on the projects they are working for. Specifically, regarding the free to play game that the company is planning, the customers are anyone who have smartphones and have some free time every day to play games for relaxing or while sitting on bus or train. The game serves the purpose of entertainment and killing time like other smartphone games, such as Candy Crush, episode or choices. Therefore, the

game will not be so complicated but will be easy to understand and surely not require much thinking and effort to play. The game will be designed phones with iOS and Android systems. If profitable, the company's ambition is to launch the game in other countries. Definitely, if that idea comes true, there will be market research on potential markets and possible issues to consider before globalizing the game.

Concerning the accounting and finance issues, the company has profit already. However, before any product, it is important to foresee the possible expenses and the revenues.

1.8 Risk and risk management

As the company is very interested in the outcome of the thesis, there is a promise that all the information needed to complete this thesis will be given to the author if needed. Therefore, the risk of not having information is eliminated. And in every stage of calculation, it is possible to have guidance and checking with the company before continuing. Possible comments and suggestions from the CEO, CFO and the producers will be considered and helpful to finish the project.

Still, the biggest concern now is it is the first time the company produces the game with free to play model; therefore, there is no previous framework and template to use. All the information will come from the research. In order to make sure that the numbers used are suitable, they will be checked and discussed with the company before being used for calculation.

To sum up, the risk comes from the uncertainty since the business model is quite new, and for the company, there is no experience about that. However, the author will work closely with the company and all the numbers will be verified together to ensure the best possible outcome.

2 Theoretical framework

As mentioned in Chapter 1, this thesis will apply the financial projection for a product learnt from school into practice for a specific product of the company; which is a free to play game in this case. The accounting book and the online sources will be used for acquiring information related to accounting.

In addition, all the sources related to free to play model game will be used. They are from online sources and from the company.

2.1 Online games and its importance

Nowadays, the numbers of people using smartphone is increasing. A statistics has shown that the number of smartphone users was only 1.57 billions in 2014 and this number is continuously growing over years. It is predicted that more than 2.5 billions people will use smartphones in 2018 and nearly 3 billions in 2020 (Number of smartphone users worldwide, 2017).

Regarding the number of mobile app downloads worldwide, statistics indicates that there is an increase over time. There were about 150 billions apps downloaded in 2016 and nearly 200 billions in 2017. In the future, it is predicted that the number of app will be more than 350 billions in 2021 (App statistics, 2017).

As the number of phone users and the mobile app used increases, the market for mobile app is promising for companies nowadays. Among those mobile apps, the market for mobile gaming app is so big that it makes other app categories small by comparison. Mobile gaming apps was 20% of active apps in the App Store of Apple in 2016, which is double the business app- the second most popular category (How the free-to-play model captured the mobile gaming market, why it's proven problematic, and how to fix it, 2017) and (Mobile attribution and marketing analytics for gaming, 2017).

Free-to-play game app has accounted for 46% of the revenue on the iOs and Google Play app markets in the US in 2012. This figure for 2016 is 66% and in 2017, 79% of revenue on app markets is from free-to- play online game. Therefore, it is seen that free-to -play is dominating mobile revenues in the market (Grubb, 2014).

In conclusion, research has shows that online gaming, especially the game using free-to-play model is a profitable business. Therefore, the production of a free-to-play game of the company is a realistic and beneficial project.

2.2 Monetization and financial projection

According to business dictionary, financial projection is a forecast of revenues and expenses for a future business activity. A financial projection will typically consider both internal information such as historical income and cost data, and estimates of the development of external market factors, providing estimated figures in addition to projections of the general financial condition of the company in the future (Financial projection definition 1, 2017).

From entrepreneur, financial projection is the estimation of future financial performance of a business activity. Financial projections help to translate the company's goal into specific targets (Financial projection definition 2, 2017).

According to Bhimani, Horngren, Datar and Rajan (2011), payback method is the capital budgeting that measures the time needed to recoup, in the form of net cash inflows, the net initial investment in a project.

From McLaney and Atrill (2016, 555), payback period is defined as an approach to appraising investments. Payback period is the time it takes for an investment to be repaid out of the net cash inflows from a project. The payback period method is widely used since it can be calculated quickly and easily. In addition, it is quite simple and can be understood by managers or people without accounting background (McLaney and Atrill 2016, 557).

From the company viewpoint, in order to accept a project, the payback period needs to be less than the maximum payback period set by the business (McLaney and Atrill 2016, 556).

Similarly, investopedia defines payback period as the length of time required to recover the cost of an investment. The payback period of a given investment or project is an important determinant of whether to undertake the position or project, as longer payback periods are typically not desirable for investment positions (Payback period, 2017).

2.3 Free-to-play game model and factors

2.3.1 Free-to-play model

Techopedia defines free to play, abbreviated as F2P, as the business model for online games in which it is free for players to play the game (Free to play). Players can experience the world, level up, socialize and have fun in the game completely free (Why are so many games converting to a free-to-play model?, 2017).

Nowadays, the free- to -play model are used by more and more apps. The consumers can first download an app for free, and the monetization later comes from in-app purchases or in-app advertising. In this case, in-app purchasing is the ability of a smartphone or mobile device to facilitate the sale of products and services within a specific application or "app" (Definition of in-app purchasing, 2017). Since that transition, most consumers start to expect quality mobile gaming apps for little or no cost (How the free-to-play model captured the mobile gaming market, why it's proven problematic, and how to fix it, 2017).

Many in-app purchases occur in games, where users are able to purchase virtual goods for the game through the app itself. It provides a new measure of profitability for apps that are often free or very inexpensive.

Even though free to play game offers players the opportunity to play without any cost, revenues are generated from 2 sources, including advertisements (in-app advertising) and in-game sales (in-app purchase). In-game sales can be payment for upgrades, having more abilities or getting some special items. In other words, F2P games center around the willingness of game players to buy items or pay for access to new content once they have tried out the game and get familiar with its mechanics. The idea of purchasing new content after playing a game, such as access to new areas or characters or levels, allows designers to create many games on the same platform and then focus on expanding those versions, thus producing in-game purchases and revenue (Techopedia explains Free To Play (F2P),2017).

Almost all players stay as free users and will not spend money for the games, there is still a limited percentage of players (normally between 1% and 20%) will eventually spend money for the game. The reasons for that spending are:

- time-for-money (players can either wait a certain amount of time to generate a vital items to continue the game or buy that items now).
- aesthetics (all players in a certain group of the game have that specific clothes. In case the players want to be the member of that group (perhaps with some benefits), they just need to buy that clothes).
- status (a specific item that players can buy which makes them look more special.)
- Short-term power-ups (players get some extra benefits, such as “10% more experience for the next hour”)(Why are so many games converting to a free-to-play model?).

From the information of the production team in the company, the reasons to spend money for F2P games can be classified as:

- Fun purchases, which means something that is simply interesting or enjoyable to obtain as decoration, dresses, fanfares, a ride on a horse, pet dinosaurs.
- Need purchases, which are something the player needs to progress in the game like passes/energy/tickets.
- Peer pressure purchases are something that gives the player great prestige, such as special frame around his avatar picture, where normal players just have a normal ones or something that prevents/erases social shaming like a silly hat or a "beginner" tag remover.
- Value purchases are any item/deal that will be very valuable and worth the money spend, like limited time offered super sales or buy 1 get 2 deals.

Indeed, depending on how the game functions, there are many other variants that developers can think of and convince players to buy.

In comparison to Pay to Play (P2P) game, (Pay-to-Play game is the one that refers to online games that customers must pay to access), free to play model is much better. Subscriptions model requires a lot of effort to convince people to spend money from the beginning, before they can experience the game. Free-to-Play model allows many players to try the game for free and enables those people who love the game after trying to buy things (Pay to Play, 2017).

To sum up, free to play is a long term solution, as it is a massive opportunity. For gamers, they can experience the game for free, including the game they would not have selected before. If they are later so interested in the game, they can start spending money to get more value. For players that remain playing freely, companies can get more players later from those players' recommendations or network (such as friends or colleagues). In addition to that, when companies get more and more players to try the game, there will be in-game advertisement as a source of revenue (why-are-so-many-games-converting-to-a-free-to-play-model, 2017).

2.3.2 Factors that affect free-to-play model

Conversion rate is the percentage of users who take a desired action in general. The desired actions can be in many forms. For example, desired action can be the change from visiting to become a membership of a website or from using the free version of a software to actually buying the complete version (Conversion rate 1, 2017).

For free to play game, conversion is defined as the numbers of game players who spend money for the game by making an in-game purchase for the first time. Conversion rate is expressed in percentage and calculated by dividing the numbers of players spending money by the total number of players. Therefore, this factor is used to evaluate the effectiveness of the game (Conversion rate 2, 2017).

Retention rate is the percentage of players who play the game in month 1 and still continue in the next month. From the company viewpoint, this figure shows how effective the game producer is at getting the players staying with the game (Retention rate, 2017). Retention rate is important because it helps to reduce the customer acquisition costs.

Daily average revenue per user (DARPU) is the average revenue that the company gets from every user per day. This number is calculated by dividing the total revenue per day by the

number of users per day. There are also other name for this factor, such as ARPDau - average revenue per daily active user (ARPDau).

After the game is produced, the next step is to get the customers for the game through marketing activities. Customer acquisition cost is the expense for the company to get the customers to play the game and is calculated by dividing the total acquisition expenses by total new customers.

Users for free to play game can be classified into two main groups, including non-paying and paying users. Non-paying users are the ones who do not spend money for buying any items in the game. In contrast, paying users are people who make an purchase in the game. Depending on the amount of money that paying users spent, they can be grouped as big spenders and medium spenders. Big spenders will spend a higher amount of money for the game than medium spenders.

3 Project tasks and results

3.1 Financial and other targets

The first target of the company is the revenue. It is expected that the game will bring 100 000 euros per month or 3 333 euros per day (100 000 euros divided by 30 days is equal 3 333 euros daily). From the financial viewpoint, the target revenue is an indicator to measure the success of the project. Should the target revenue is not reached after a certain amount of time, the company needs to seriously investigate the problems and find the solutions accordingly. If the actual revenue exceeds the target, the company can also modify the strategy, such as globalizing the game earlier, to have more profit.

The payback time should happen within 2 years, as the game for smart phone lasts normally 2 years, the break even must happen in 2 year and ideally in the first year; so that the company can be profitable in the second year. In the future, depending on how the market is, those target numbers can be changed.

The next figure to consider is the conversion rate. As conversion rate change from game to game, it is important to choose the reasonable and realistic rate for the calculation. Free to play game has the conversion rate from under 1% to around 17%. The managing director of SuperData said that a conversion rate of 2-10% is reasonable (Conversion rate 2, 2017). For this game, the assumption of the rate from the company is from 1% to 5%.

Retention rate is also an important rate, as it measures the number of players who will stay with the game after trying it. The company aims for the retention rate of 50% after the first day, 30% after the seventh day and 20% after 30th day.

The cost per install (CPI) is the marketing cost to acquire new user. At this moment, the company has not decided which marketing firm to co-operate with; therefore, it is safe to take average cost per install in Germany for the calculation because the first target market of the game is Germany. The cost per install for Germany is 2.48 dollars (Chartboost-cost per install, 2017). Converted to euros, it will be 2.22 euros since the exchange rate applied is 1 dollar is equal to 0.895333 euro (Exchange rate, 2017). The figure from Chartboost helps to have the idea of the CPI; however, depending on the marketing agency chosen later, CPI can be changed, but the number should stay close to the average CPI for Germany as the research from Chartboost suggests.

3.2 Expenses of the game

The first expense of the company is the cost from production activities. Production steps include concept, proof of concept, development container app, soft launch package, editor development, launch content package. Totally, those costs will be 458 100 euros. After the game is produced, there is also a need to maintain the game, called monthly live operations. This cost is 11 400 euros per month.

In the scope of this thesis, the production cost and live operations monthly is estimated by the production team. Those costs will be used when calculating payback period; therefore, only the total number is needed. Thus, details of how to calculate the cost will not be mentioned.

The final cost is the cost for marketing activities to attract new players. The marketing cost per user (also call cost per installer-CPI) is 2.22 euros. The cost for marketing is calculated by multiplying the cost per installer (2.22 euros) to the number of new users needed. Therefore, this number is varied depending on the number of new users.

3.3 Players of the game

As mentioned above, there are non-paying users (no spenders) and paying users (spenders). The possible conversion rate is 1%, 2%, 3%, 4% or 5%; which means that the ration between the spenders and total users is 1%, 2%, 3%, 4% and 5%. If spenders are nominated as a, and no spenders are nominated as b, then total users will be the sum of a and b ($a + b$). Therefore, the conversion rate fomular is as follow:

$$a / (a + b) = 1 / 100 \text{ (conversion rate of 1\%)}$$

$$a / (a + b) = 2 / 100 \text{ (conversion rate of 2\%)}$$

$$a / (a + b) = 3 / 100 \text{ (conversion rate of 3\%)}$$

$$a / (a + b) = 4 / 100 \text{ (conversion rate of 4\%)}$$

$$a / (a + b) = 5 / 100 \text{ (conversion rate of 5\%)}$$

and thus,

$$b / (a + b) = 99 / 100 \text{ (conversion rate of 1\%)}$$

$$b / (a + b) = 98 / 100 \text{ (conversion rate of 2\%)}$$

$$b / (a + b) = 97 / 100 \text{ (conversion rate of 3\%)}$$

$$b / (a + b) = 96 / 100 \text{ (conversion rate of 4\%)}$$

$$b / (a + b) = 95 / 100 \text{ (conversion rate of 5\%)}$$

Therefore, the ratio between the spenders (a) and no spenders (b) will be as follow:

$$a / b = 1\% / 99\% \text{ (conversion rate of 1\%)}$$

$$a / b = 2\% / 98\% \text{ (conversion rate of 2\%)}$$

$$a / b = 3\% / 97\% \text{ (conversion rate of 3\%)}$$

$$a / b = 4\% / 96\% \text{ (conversion rate of 4\%)}$$

$$a / b = 5\% / 95\% \text{ (conversion rate of 5\%)}$$

In the paying users (spenders) group, depending on the amount of money spent, they will be divided into 2 small groups, including big and medium spenders. The ratio is decided to be 6% / 94% after the discussion with the Chief Finance Officer (CFO) on 17 June 2017. In other words, it means 94% of spenders will be big spenders and 6% will be medium spenders. For big spenders, it is expected that they will spend 1.99 euros per day for the game and 0.48 euros per day will be spent by the medium spenders.

3.4 Project calculation

3.4.1 Number of spenders needed

The first calculation's result will be the number of each kind of users for the game, including big, medium and no spender. Also, the total users needed will be measured.

The number of big spender daily will be nominated as x, medium spender will be y and no spenders will be z in the following calculation.

As mentioned above, conversion rate is the ratio between of no spender group and spender group. Therefore, this ratio can be written as $(x+y) / (x+y+z)$.

From the ratio between big and medium spenders (6% and 94%), we have: $x/y = 6\%/94\%$

As big spenders spend 1.99 euros per day and medium spenders spend 0.48 euros per day, and the expected revenue daily is 3333 euros, we have: $1.99 \cdot x + 0.48 \cdot y = 3\,333$

From 2 equations with 2 variables x and y , the calculation shows that x is equal 350.51 and y is equal 5491. In other words, about 351 big spenders and 5 491 medium spenders are needed per day to reach the expected revenue of 3 333 euros.

In order to calculate the numbers of no spenders, the conversion rate is needed. Therefore, the final formula is $(351 + 5491)/(351+5491+z) = \text{conversion rate}$ (1%, 2%, 3%, 4% or 5%)

The daily average revenue per user (DARPU) is calculated by dividing the revenue per day (3 333 euros) to the total users per day.

		conversion rate	total users/day	DARPU
Number of user/month				
big spender(x)	350.51			
medium spender(y)	5,491			
no spender(z)	578,339	1%	584,180	0.006
	286,248	2%	292,090	0.011
	188,885	3%	194,727	0.017
	140,203	4%	146,045	0.023
	110,994	5%	116,836	0.029

Figure 1: Number of spenders, depending on the conversion rate

If the conversion rate is 1%, the number of no spenders will be the highest: 578 339. When the conversion rate increases to 2%, 3%, 4% or 5%, the numbers of no spenders needed will reduce. In this case, those numbers are 286 248 (conversion rate is 2%), 188 885 (conversion rate is 3%), 140 203 (conversion rate is 4%) and 110 994 (conversion rate is 5%).

The total users/day column in the table shows the total users needed daily, to reach the target revenue daily. The total user number is calculated as the sum of big spenders, medium spenders and no spenders. The total users are 584 180 people, 292 090 people, 194 727 people, 146 045 people and 116 836 people, corresponding to the conversion rate of 1%, 2%, 3%, 4% and 5%.

The daily average revenue per user (DARPU) is calculated by dividing the revenue per day (3333 euros) to the total users per day. DARPU varies depending on the conversion rate. The higher the conversion rate is, the more positive the DARPU is.

At this point, the DARPU is discussed with the company with the help of a consultant on 16 June 2017. After the discussion, it is decided that the DARPU is classified as follow:

DARPU (Daily Average Revenue Per User)	
Less good	0.02 €
Good	0.15 €
Excellent	0.50 €

Figure 2: DARPU

If the DARPU is from 0.02 to less than 0.15 euro, it is less good. From 0.15 to less than 0.5 euro, the DARPU is good and it is excellent when the number is from 0.5 euro.

Therefore, from figure 1, the DARPU of the game will be in the "less good" group when the conversion rate is 4% (0.023 euro) or 5% (0.029 euro). Thus, the new target for the conversion rate is 4% or 5%.

Finally, the total number of players daily is the sum of 3 kinds of users is 146 045 people (conversion rate is 4%) and 116 836 people (conversion rate is 5%).

3.4.2 Retention rate and marketing cost

Every day, the company expects to have a certain amount of players (146 045 people - conversion rate of 4% or 116 836 people - conversion rate of 5%) to ensure the target revenue of 3333 euros daily. After a day, there will be users who leave the game; therefore, there is a need to get new users to ensure that the number of users (146 045 users or 116 836 users) is reached. In order to calculate the number of new users needed per day, the first step is to measure the number of users who will stay with the game after trying it by using the retention rate.

From Gamedonia, the formula for the retention rate is taken as follow (Five ways to calculate lifetime value for free to play games, 2017):

$$F(t) = A + \frac{B}{t+C}$$

Formula 1: Retention rate

As mentioned above, for this game, the company targets the retention rate of 50% after 1 day, 30% after 7 days and 20% after 30 days. Applied to the formula, there will be 3 equations to solve 3 variables A, B and C:

$$F(1) = A + B / (1 + C) = 50\%$$

$$F(7) = A + B / (7 + C) = 30\%$$

$$F(30) = A + B / (30 + C) = 20\%$$

The calculation shows that A is equal 0.155, B is equal 1.50075 and C is equal 3.35. Therefore, the formula for the retention rate is $F(t) = 0.155 + 1.50075 / (3.35 + t)$. By substituting t with the time (day), the retention rate for that specific day will be calculated.

1	50.00%
2	43.55%
3	39.13%
4	35.92%
5	33.47%
6	31.55%
7	30.00%
8	28.72%
9	27.65%
10	26.74%
11	25.96%
12	25.28%
13	24.68%
14	24.15%
15	23.68%
16	23.26%
17	22.87%
18	22.53%
19	22.21%
20	21.93%
21	21.66%
22	21.42%
23	21.20%
24	20.99%
25	20.79%
26	20.61%
27	20.44%
28	20.29%
29	20.14%
30 Month 1	20.00%

Figure 3: Retention rate for the first 30 days

The retention rate, as calculated from Excel, gradually reduces every day from 50% (day 1st) to 20% (day 30th).

From the retention rate, the number of retained users (users who stay with the game) will be calculated. After that, the number of new users needed to reach the target total user per day

is measured. New users can be acquired from marketing and from recommendations of old users. For new users from marketing activity, the company needs to pay the marketing expense. The new users from recommendations are acquired without any cost.

For this game, the company expects the new users acquired without marketing effort will be 20% per month or 0.667% per day and the users acquired through marketing will cost 2.22 euros per user.

Days		New users(acquired without marketing); 20% per month OR 0.667% per day	Users needed	Retained users	Total users	Cost per use	Total CPI/day	Total CPI/month
		0.667%						
1			116,836.08	-	116,836	2.22	259,425.85	
2		778.91	57,639.13	58,418	116,836	2.22	127,983.42	
3		384.26	32,931.13	83,521	116,836	2.22	73,121.13	
4		219.54	20,208.63	96,408	116,836	2.22	44,871.76	
5		134.72	13,034.84	103,667	116,836	2.22	28,942.88	
6		86.90	8,719.50	108,030	116,836	2.22	19,361.01	
7		58.13	5,997.20	110,781	116,836	2.22	13,316.33	
8		39.98	4,216.19	112,580	116,836	2.22	9,361.73	
9		28.11	3,017.07	113,791	116,836	2.22	6,699.18	
10		20.11	2,190.79	114,625	116,836	2.22	4,864.48	
11		14.61	1,610.45	115,211	116,836	2.22	3,575.87	
12		10.74	1,196.27	115,629	116,836	2.22	2,656.23	
13		7.98	896.65	115,931	116,836	2.22	1,990.95	
14		5.98	677.37	116,153	116,836	2.22	1,504.04	
15		4.52	515.25	116,316	116,836	2.22	1,144.06	
16		3.43	394.32	116,438	116,836	2.22	875.57	
17		2.63	303.43	116,530	116,836	2.22	673.74	
18		2.02	234.62	116,599	116,836	2.22	520.97	
19		1.56	182.22	116,652	116,836	2.22	404.62	
20		1.21	142.09	116,693	116,836	2.22	315.51	
21		0.95	111.20	116,724	116,836	2.22	246.92	
22		0.74	87.32	116,748	116,836	2.22	193.89	
23		0.58	68.77	116,767	116,836	2.22	152.71	
24		0.46	54.32	116,781	116,836	2.22	120.62	
25		0.36	43.02	116,793	116,836	2.22	95.52	
26		0.29	34.15	116,802	116,836	2.22	75.82	
27		0.23	27.17	116,809	116,836	2.22	60.32	
28		0.18	21.66	116,814	116,836	2.22	48.09	
29		0.14	17.30	116,819	116,836	2.22	38.42	
30	Month 1	0.12	13.85	116,822	116,836	2.22	30.75	602,672.38

Figure 4: Marketing cost for the first 30 days (month 1) (conversion rate of 5%)

The calculation from Excel is for the conversion rate 5% ,corresponding to the total users needed per day of 116 836 people. The cost per installer (CPI) is 2.22 euros per person. For the first day, the total CPI (or marketing cost) is 259 425.85 euros (116 836 people * 2.22 euros = 259 425.85 euros).

From day 2, there will be some players that continue to play the game, called retained users. The retained users number of day 2 is calculated by multiplying the users needed from day 1 with the retention rate of day 2 from figure 3. The retained users number of day 3 is the sum of the retained users of day 2 plus the new retained users (calculated by multiplying the users needed of day 2 with the retention rate of day 3). The retained users number of day 4 is the sum of the retained users of day 2, day 3 and the new retained users (calculated by multiplying the users needed of day 3 with the retention rate of day 4). Similarly, the retained users number of day X is the sum of the retained users of all the previous day plus the new retained

users (calculated by multiplying the users needed of day $X - 1$ (the previous day) with the retention rate of day X).

In addition, there are always new users trying the game from the recommendations of current users or by chance. Those are considered as new users but free of marketing expense for the company. Those users are calculated by timing the rate of 0.667% with the users needed. Even though that rate is the same for every day (0,667%), the new users acquired without marketing cost is still reduced gradually, because the users needed every day is reduced.

Finally, the users needed per day is calculated by the following formula: Users needed per day = Total users -(retained users + new users acquired without marketing effort). The total users stays the same every day, which is 116 836 people per day.

The retained users is increasing gradually, as it is the sum of all the retained users from all the previous day with the new retained users. The new users acquired without marketing is reduced day by day, since the users needed is reduced day by day. From the calculation, it is seen that the new users that the company need to attract through marketing decreases gradually.

Finally, the total CPI per day is the marketing cost that the company needs to pay to get the users; therefore it is the results from the calculation of cost per user multiply the users needed.

Since the users needed reduces every day, the marketing expense per day reduces gradually, which allows the company to cover all the costs and later, be profitable.

After 30 days, the total marketing expense for the company is 602 672.38 euros. It is the sum of marketing expenses of the first 30 days.

Similarly, the marketing cost of the next 30 days (from day 31st to day 60th) is 127.54 euros.

Days		New users(acquired without marketing): 20% per month OR 0.667% per day	Users needed	Retained users	Total users	Cost per use	Total CPI/day	Total CPI/month
31		2.77	8.42	116,825	116,836	2.22	18.70	
32		1.68	7.83	116,827	116,836	2.22	17.40	
33		1.57	6.41	116,828	116,836	2.22	14.22	
34		1.28	5.43	116,829	116,836	2.22	12.07	
35		1.09	4.57	116,830	116,836	2.22	10.14	
36		0.91	3.85	116,831	116,836	2.22	8.56	
37		0.77	3.25	116,832	116,836	2.22	7.22	
38		0.65	2.75	116,833	116,836	2.22	6.10	
39		0.55	2.32	116,833	116,836	2.22	5.16	
40		0.46	1.97	116,834	116,836	2.22	4.36	
41		0.39	1.66	116,834	116,836	2.22	3.70	
42		0.33	1.41	116,834	116,836	2.22	3.13	
43		0.28	1.20	116,835	116,836	2.22	2.66	
44		0.24	1.01	116,835	116,836	2.22	2.25	
45		0.20	0.86	116,835	116,836	2.22	1.91	
46		0.17	0.73	116,835	116,836	2.22	1.62	
47		0.15	0.62	116,835	116,836	2.22	1.38	
48		0.12	0.53	116,835	116,836	2.22	1.17	
49		0.11	0.45	116,836	116,836	2.22	1.00	
50		0.09	0.38	116,836	116,836	2.22	0.85	
51		0.08	0.33	116,836	116,836	2.22	0.72	
52		0.07	0.28	116,836	116,836	2.22	0.62	
53		0.06	0.24	116,836	116,836	2.22	0.53	
54		0.05	0.20	116,836	116,836	2.22	0.45	
55		0.04	0.17	116,836	116,836	2.22	0.38	
56		0.03	0.15	116,836	116,836	2.22	0.33	
57		0.03	0.13	116,836	116,836	2.22	0.28	
58		0.03	0.11	116,836	116,836	2.22	0.24	
59		0.02	0.09	116,836	116,836	2.22	0.20	
60	Month 2	0.02	0.08	116,836	116,836	2.22	0.17	127.54

Figure 5: Marketing cost for the next 30 days (month 2) (conversion rate of 5%)

Days		New users(acquired without marketing): 20% per month OR 0.667% per day	Users needed	Retained users	Total users	Cost per use	Total CPI/day	Total CPI/month
61		0.02	0.07	116,836	116,836	2.22	0.15	
62		0.01	0.06	116,836	116,836	2.22	0.13	
63		0.01	0.05	116,836	116,836	2.22	0.11	
64		0.01	0.04	116,836	116,836	2.22	0.09	
65		0.01	0.04	116,836	116,836	2.22	0.08	
66		0.01	0.03	116,836	116,836	2.22	0.07	
67		0.01	0.03	116,836	116,836	2.22	0.06	
68		0.01	0.02	116,836	116,836	2.22	0.05	
69		0.00	0.02	116,836	116,836	2.22	0.04	
70		0.00	0.02	116,836	116,836	2.22	0.04	
71		0.00	0.01	116,836	116,836	2.22	0.03	
72		0.00	0.01	116,836	116,836	2.22	0.03	
73		0.00	0.01	116,836	116,836	2.22	0.02	
74		0.00	0.01	116,836	116,836	2.22	0.02	
75		0.00	0.01	116,836	116,836	2.22	0.02	
76		0.00	0.01	116,836	116,836	2.22	0.01	
77		0.00	0.01	116,836	116,836	2.22	0.01	
78		0.00	0.00	116,836	116,836	2.22	0.01	
79		0.00	0.00	116,836	116,836	2.22	0.01	
80		0.00	0.00	116,836	116,836	2.22	0.01	
81		0.00	0.00	116,836	116,836	2.22	0.01	
82		0.00	0.00	116,836	116,836	2.22	0.01	
83		0.00	0.00	116,836	116,836	2.22	0.01	
84		0.00	0.00	116,836	116,836	2.22	0.00	
85		0.00	0.00	116,836	116,836	2.22	0.00	
86		0.00	0.00	116,836	116,836	2.22	0.00	
87		0.00	0.00	116,836	116,836	2.22	0.00	
88		0.00	0.00	116,836	116,836	2.22	0.00	
89		0.00	0.00	116,836	116,836	2.22	0.00	
90	Month 3	0.00	0.00	116,836	116,836	2.22	0.00	1.03

Figure 6: Marketing cost for the next 30 days (month 3) (conversion rate of 5%)

With the same method, the total cost per install (or the marketing cost) in month 3 (from day 61st to day 90th) is 1.03 euros.

As the number of retained users is increasing, the users needed is decreasing, thus the marketing cost is decreasing.

The marketing cost from month 4th will be calculated in Excel with the same idea.

With the same method, the marketing cost when the conversion rate is 4% is calculated.

3.4.3 Payback time

The next step is to calculate if the payback time will be within 2 years. In other words, within 2 years, the profit generated needs to cover all the expenses.

When the cash flow is the same, the payback period is calculated as net initial investment divided by the uniform increase in cash flow. However, when the cash flow is different, the payback needs to be calculated in a cumulative form (Bhimani, Horngren, Datar and Rajan, 2011).

With the idea of payback period in accounting, the problem to be solved in this project is estimate the payback time to see if it happens in 2 years. Therefore, the net initial investment will be the money the company needs to invest to produce the game, which is expenses in this case. There are three kinds of expenses for the company, including the production expense, live operation expense monthly and the marketing expense monthly. The cashflow in this case will be the money the company gets from the customers; namely the monthly revenue.

Even though the monthly revenue is the same; the total expense is different, because the monthly marketing cost changes over time. Therefore, the payback computation needs to be done as a cumulative form.

The production cost of the game is 458 100 euros. In addition to that, there is the live operation cost per month, to maintain the game, which is 11 400 euros per month. Those 2 numbers are calculated from the production team in the company. Finally, there is marketing effort needed to attract users. Therefore, the total cost of the game is the sum of the production cost, live operation cost and marketing cost.

As the marketing cost reduces, the profit monthly increases. Therefore, the company can pay back the production cost.

The revenue per month and the live operation cost per month stays the same, which are 100 000 euros and 11 400 euros respectively. The marketing costs reduce gradually over time, which can be found from the previous calculation. The monthly profit is the result of the formula:

Profit = revenue per month - live operation cost per month - marketing cost =
100 000 - 11400 - marketing cost.

Formula 2: Monthly profit

The cumulative profit is the profit that the company has over time. The cumulative profit of month 2 is the sum of profits after month 1 and 2. Similarly, the cumulative profit of month X is the sum of profits of from month 1 to month X.

Conversion rate of 5%:

Production cost	458,100				
	Revenue per month	Live operation cost per month	Marketing cost	Profit	Cummulative profit
Month 1	100,000	11,400	602,672.380	-514,072	-514,072
Month 2	100,000	11,400	127.538874541	88,472	-425,600
Month 3	100,000	11,400	1.031926091	88,599	-337,001
Month 4	100,000	11,400	0.000021452	88,600	-248,401
Month 5	100,000	11,400	0.000135304	88,600	-159,801
Month 6	100,000	11,400	0.000000113	88,600	-71,201
Month 7	100,000	11,400	0.000000025	88,600	17,399
Month 8	100,000	11,400	0.000000002	88,600	105,999
Month 9	100,000	11,400	0.000000002	88,600	194,599
Month 10	100,000	11,400	0.000000002	88,600	283,199
Month 11	100,000	11,400	0.000000002	88,600	371,799
Month 12	100,000	11,400	0.000000002	88,600	460,399
Month 13	100,000	11,400	0.000000002	88,600	548,999
Month 14	100,000	11,400	0.000000002	88,600	637,599
Month 15	100,000	11,400	0.000000002	88,600	726,199
Month 16	100,000	11,400	0.000000002	88,600	814,799
Month 17	100,000	11,400	0.000000002	88,600	903,399
Month 18	100,000	11,400	0.000000002	88,600	991,999

Figure 7: Payback time (conversion rate of 5%)

After the first month, the company makes loss of 514 072 euros. However, from month 2, the company starts to have profit, as the marketing costs reduce. After 7 months, the company is able to cover the loss of the first month and have the profit of 17 399 euros. Then, after 12 months, the cumulative profit is 460 399, which is higher than the production cost of 458 100 euros. Therefore, it is seen that, after 12 months (1 year), the company can pay back the production cost and start to have profit of 2 299.05 euros (460 399 euros - 458 100 euros = 2 299 euros). The payback period (with the conversion rate of 5%) is 12 months.

Conversion rate of 4%:

Production cost	458,100				
	Revenue per month	Live operation cost per month	Marketing cost	Profit	Cummulative profit
Month 1	100,000	11,400	753,340	-664,740	-664,740
Month 2	100,000	11,400	159	88,441	-576,300
Month 3	100,000	11,400	1.289907613322	88,599	-487,701
Month 4	100,000	11,400	0.000026814464	88,600	-399,101
Month 5	100,000	11,400	0.000169129630	88,600	-310,501
Month 6	100,000	11,400	0.000000141517	88,600	-221,901
Month 7	100,000	11,400	0.000000031057	88,600	-133,301
Month 8	100,000	11,400	0.000000004847	88,600	-44,701
Month 9	100,000	11,400	0.000000004847	88,600	43,899
Month 10	100,000	11,400	0.000000004847	88,600	132,499
Month 11	100,000	11,400	0.000000004847	88,600	221,099
Month 12	100,000	11,400	0.000000004847	88,600	309,699
Month 13	100,000	11,400	0.000000004847	88,600	398,299
Month 14	100,000	11,400	0.000000004847	88,600	486,899
Month 15	100,000	11,400	0.000000004847	88,600	575,499
Month 16	100,000	11,400	0.000000004847	88,600	664,099
Month 17	100,000	11,400	0.000000004847	88,600	752,699
Month 18	100,000	11,400	0.000000004847	88,600	841,299

Figure 8: Paybacktime (conversion rate of 4%)

Similarly, after the first month, the company makes loss of 664 740 euros. However, from month 2, the company starts to have profit, as the marketing costs reduce. After 9 months, the company is able to cover the loss of the first month (664 740 euros) and have the profit of 43 899 euros. Then, after 14 months, the cumulative profit is 486 899 euros, which is higher than the production cost of 458 100 euros. Therefore, it is seen that, after 14 months, the company can pay back the production cost and start to have profit of 28 798 euros (486 899 euros - 458 100 euros= 28 798 euros). With the conversion rate of 4%, the payback period is 14 months.

3.4.4 Mechanism of the game

The game is designed as the story of characters. Each story has 15 chapters and each chapter lasts 15 minutes. Therefore, the total time needed for each story is 3 hours 45 minutes (15 minutes/chapter * 15 chapters= 225 minutes or 3 hours 45 minutes).

The currencies used in the game are gem and ticket. Ticket is used to start the chapter and gem is used to buy “options” in each chapter. Tickets and gems can be bought or can be gained in the game for free.

For each chapter, there are 2 options and the players can choose 1. Different option chosen will lead to different ending for the story. Therefore, depending on the choices, the users will have different experience with the game.

Chapter	1	Option	big (50 gems) - small (0 gem)
	2		medium (30 gems) - small (0 gem)
	3		big (50 gems) - small (0 gem)
	4		medium (30 gems) - small (0 gem)
	5		big (50 gems) - small (0 gem)
	6		medium (30 gems) - small (0 gem)
	7		big (50 gems) - small (0 gem)
	8		medium (30 gems) - small (0 gem)
	9		big (50 gems) - small (0 gem)
	10		medium (30 gems) - small (0 gem)
	11		big (50 gems) - small (0 gem)
	12		medium (30 gems) - small (0 gem)
	13		big (50 gems) - small (0 gem)
	14		medium (30 gems) - small (0 gem)
	15		big (50 gems) - small (0 gem)

Figure 9: Options for each chapter

As mentioned above, each chapter will have 2 options: one option is free and the other costs gems. The game is designed so that chapters with odd number will have big option (50 gems) and small option (0 gem) and chapters with even number will have medium option (30 gems) and small option (0 gem). Big and medium options will grant the more interesting ending for the players.

When a chapter is finished, the players can get 2 achievements. Each achievement grants 1 or 3.5 gems, with the ratio of 40% and 60%. In average, each achievement will give the players 2 gems and finishing a chapter rewards the players with 4 gems.

The ticket is generated every 4 hours and is capped at 2 tickets. In other words, the player can get 1 ticket after 4 hours and 1 more ticket after another 4 hours. The game will not generate any further tickets regardless of the waiting time, if the 2 generated tickets are not "opened" and use in the game. At the beginning of the story, each player will have 1 ticket and 60 gems.

In order to reach the target revenue, the big spenders need to spend 1.99 euros per day and the medium spenders need to spend 0.48 euros per day. For no spenders, they will not spend money for the game.

For big spenders, it is assumed that they are willing to spend money for the game and buy tickets and gems to experience the best result of the story. Big spenders will finish 1 story (15 chapters) every day. They need 15 tickets and 610 gems to play the story.

For the first day, when beginning the game, player gets 1 ticket and 60 gems for free. Therefore, he needs to buy 14 tickets and 550 gems.

After the first day, the players get 2 tickets for free (after 8 hours) and 60 gems from finishing 15 chapters (15 chapters x 2 achievements/chapter x 2 gems/ achievement = 60 gems). In addition to that, he gets 1 ticket and 60 gems for free when starting chapters 2. Therefore, he has 3 tickets and 120 gems already and thus, needs to buy 12 tickets and 490 gems.

Similarly, for day 3, he has 3 tickets (2 tickets after 8 hours and 1 ticket when beginning the story) and 120 gems (60 gems from achievements and 60 gems when starting the story); hence, there is a need to buy 12 tickets and 490 gems.

			free tickets	free gems	tickets bought	gems bought	tickets spent	gems spent
day 1	1 ticket and 60 gems free (beginning of the story)	chapter 1-15 (1st story)	1	60	14	550	15	610
day 2	1 ticket (beginning of the story)+2 tickets (after 8 hours)	chapter 1-15 (2nd story)	3	120	12	490	15	610
day3	1 ticket (beginning of the story)+2 tickets (after 8 hours)	chapter 1-15 (3rd story)	3	120	12	490	15	610
...								
day 30	1 ticket (beginning of the story)+2 tickets (after 8 hours)	chapter 1-15 (30th story)	3	120	12	490	15	610

Figure 10: Tickets and gems used by big spenders

For the medium spenders (players), they are less willing to spend money for the game; therefore, it is assumed that they will both buy the tickets and gems and wait (4 hours or 8 hours) to get free tickets to continue the game.

Medium players will spend 75 minutes (1 hour and 15 minutes) to finish 5 chapters of the story each day. Therefore, they will finish the story (15 chapters) in 3 days.

For the first day, they get 1 ticket and 60 gems free when beginning the story (chapter 1). In order to finish 5 chapters, they buy 3 tickets and wait 4 hours to get 1 ticket free. They will buy 85 gems and get 20 gems from achievements of 5 chapters. In total, they have 165 gems (60 gems from beginning , 85 gems from buying and 20 gems from achievements) and they spend 130 gems (big option (50 gems) for chapter 1, medium option (30 gems) for chapter 2, big option (50 gems) for chapter 3 and small option (0 gem) for chapter 4 and 5). Therefore, at the end of the day, there is no ticket left but 35 gems for the next day (165 gems - 130 gems = 35 gems).

The second day, after 8 hours of waiting, the player gets 2 tickets for free, which are used to play chapter 6 and 7. After that, they will buy 2 tickets and wait 4 hours to get 1 free ticket to be able to play 3 more chapters (chapter 8, 9 and 10). Regarding the gems, they have 35 gems from the previous day and 20 gems from achievements. They will buy 45 gems more; thus, the total gems having is 100 gems. They will spend 30 gems for chapter 6 and 50 gems for chapter 7; thus, having 20 gems left for the next day.

The third day, they get automatically 2 free tickets after 8 hours of waiting, buy 2 tickets more and wait 4 hours more to get 5 tickets for the last 5 chapters of the story (chapter 10 to chapter 15). For gems, they have 20 gems left from the second day, buy 45 gems more and get 20 gems from achievement; therefore, they have 85 gems totally. Medium player will choose 1 big option (50 gems) and 1 medium option (30 gems), thus, they have 5 gems left for the next day.

		Estimated time to play the game	free tickets	free gems and gems left from previous day	free gems from finishing 5 chapters	tickets bought	gems bought	tickets spent	gems spent	tickets left	gems left
day 1	At the beginning of new story (chapter 1), the player is granted 1 ticket and 60 gems	8h-8h15: chapter 1 8h15-8h30: chapter 2 8h30-8h45: chapter 3 8h45-9h00: chapter 4 break 3h: 1 ticket free 12h-12h15: chapter 5 break 8h: 2 tickets free	1	60	20	3	85	5	130	0	35
day 2	2 free tickets (after 8 hours)	8h-8h15: chapter 6 8h15-8h30: chapter 7 8h30-8h45: chapter 8 8h45-9h00: chapter 9 break 3h: 1 ticket free 12h-12h15: chapter 10 break 8h: 2 tickets free	2	35	20	2	45	5	80	0	20
day 3	2 free tickets (after 8 hours)	8h-8h15: chapter 11 8h15-8h30: chapter 12 8h30-8h45: chapter 13 8h45-9h00: chapter 14 break 3h: 1 ticket free 12h-12h15: chapter 15 break 8h: 2 tickets free	2	20	20	2	45	5	80	0	5

Figure 11: Tickets and gems used by medium spenders (day 1, 2 and 3)

The fourth day starts with the beginning of the new story (story 2); thus the users have 1 ticket and 60 gems free. In addition, the player has 5 gems left from the third day, and will buy 80 gems more. Together with 20 gems from achievements, the player has 165 gems. Regarding the tickets, they have 1 ticket as beginning the chapter 1, 2 tickets from 8 hours of waiting. The player will finish chapter 1, 2 and 3 ; then, buy 1 ticket and wait 4 hours more for 1 tickets; thus, they can finish the 2 chapters left. The player will choose 2 big options (50

gems for each) and 1 medium option (30 gems); thus, they have 35 gems left (165 gems- 130 gems= 35 gems).

The fifth day happens the same as the second day and the sixth day happens as the third day. Similarly, the seventh, eighth and ninth will be the same as the fourth, fifth and sixth day.

		Estimated time to play the game	free tickets	free gems and gems left from previous day	free gems from finishing 5 chapters	tickets bought	gems bought	tickets spent	gems spent	tickets left	gems left
day 4	New story grants 1 ticket and 60 gems. 8 hours of break grants 2 tickets. There are 5 gems left from day 3. So, the player has 3 tickets and 65 gems	8h-8h15: chapter 1 8h15-8h30: chapter 2 8h30-8h45: chapter 3 8h45-9h00: chapter 4 break 3h: 1 ticket free 12h-12h15: chapter 5 break 8h: 2 tickets free	3	65	20	1	80	5	130	0	35
day 5	2 free tickets (after 8 hours)	8h-8h15: chapter 6 8h15-8h30: chapter 7 8h30-8h45: chapter 8 8h45-9h00: chapter 9 break 3h: 1 ticket free 12h-12h15: chapter 10 break 8h: 2 tickets free	2	35	20	2	45	5	80	0	20
day 6	2 free tickets (after 8 hours)	8h-8h15: chapter 11 8h15-8h30: chapter 12 8h30-8h45: chapter 13 8h45-9h00: chapter 14 break 3h: 1 ticket free 12h-12h15: chapter 15 break 8h: 2 tickets free	2	20	20	2	45	5	80	0	5

Figure 12: Tickets and gems used by medium spenders (day 4, 5 and 6)

		Estimated time to play the game	free tickets	free gems and gems left from previous day	free gems from finishing 5 chapters	tickets bought	gems bought	tickets spent	gems spent	tickets left	gems left
day 7	New story grants 1 ticket and 60 gems. 8 hours of break grants 2 tickets. There are 5 gems left from day 6. So, the player has 3 tickets and 65 gems	8h-8h15: chapter 1 8h15-8h30: chapter 2 8h30-8h45: chapter 3 8h45-9h00: chapter 4 break 3h: 1 ticket free 12h-12h15: chapter 5 break 8h: 2 tickets free	3	65	20	1	80	5	130	0	35
day 8	2 free tickets (after 8 hours)	8h-8h15: chapter 6 8h15-8h30: chapter 7 8h30-8h45: chapter 8 8h45-9h00: chapter 9 break 3h: 1 ticket free 12h-12h15: chapter 10 break 8h: 2 tickets free	2	35	20	2	45	5	80	0	20
day 9	2 free tickets (after 8 hours)	8h-8h15: chapter 11 8h15-8h30: chapter 12 8h30-8h45: chapter 13 8h45-9h00: chapter 14 break 3h: 1 ticket free 12h-12h15: chapter 15 break 8h: 2 tickets free	2	20	20	2	45	5	80	0	5

Figure 13: Tickets and gems used by medium spenders (day 7, 8 and 9)

For no spenders, they will not spend money for buying tickets and gems. They play the game by waiting 8 hours or 4 hours to get tickets free besides the 1 ticket free when beginning chapter 1 of each story.

To sum up, the big and medium spenders will buy the tickets and gems per day as follow:

Big spenders	tickets	gems
day 1	14	550
from day 2	12	490

Figure 14: Tickets and gems bought by big spenders

Medium spenders	tickets	gems
day 1	3	85
day 2	2	45
day 3	2	45
day 4	1	80
day 5	2	45
day 6	2	45

Figure 15: Tickets and gems bought by medium spenders

The next calculation is the price of the tickets and gems in the game:

	Number	Total price	Price per ticket		Number	Total price	Price per gem
Ticket	1	0.1	0.1000000	Gem	45	0.29	0.00644
	2	0.19	0.0950000		80	0.45	0.00563
	3	0.26	0.0866667		85	0.47	0.00553
	12	0.99	0.0825000		490	1	0.00204
	14	1.09	0.0778571		550	1.09	0.00198

Figure 16: Price of tickets and gems

		tickets	gems	price
Big spenders	day 1	14	550	2,18
	from day 2	12	490	1,99
Medium spenders	day 1	3	85	0,73
	day 2	2	45	0,48
	day 3	2	45	0,48
	day 4	1	80	0,55
	day 5	2	45	0,48
	day 6	2	45	0,48

Figure 17: The money spent by big and medium spenders every day

From figure 16 and 17, the money big and medium users spend for the game daily can be calculated. It is seen that big spenders will spend at least 1.99 euros per day while medium players will spend at least 0.48 euro per day. That is how the game is designed and the price for items are set, to make sure that as big and medium spenders will spend the target amount of money for the game daily as the company expects.

3.5 Other ideas for streams of revenue

Among three kinds of expenses (production cost, live operation monthly cost and cost for new users acquisition), the production cost and live operation monthly are unavoidable costs. However, the cost for new users acquisition can be reduced if the retention rate increases. In order

to have higher retention rate, the stories in the game should be made to be more attractive and interesting to make the users continue “reading” new stories or even “re-read” a certain story. “Re-read” or “replay” is the idea of designing the game so that the players have more possibilities to experience the game. Users can choose another option for a choice and thus, “read the story differently” and have a new ending for that story.

Second is the library idea. Library is a “place” that our company will provide necessary elements for users to write their stories. The “library” will have characters, sounds, items needed to “write” a story. Users need to pay a certain “fee” to access the library. The revenue for the company will come from that “fee”. Further idea will be, if there story written by that user is attractive enough to other users, the company can reward them some money or benefits to keep them continuing to “write” the stories for the game.

Globalization the game is also a stream of revenue. Once the game is produced and serves German customers successfully, the company can “bring” the game to other markets with new customers. In this case, only the translation cost that is new and needs to be considered.

4 Conclusion

4.1 Key outcomes

The main profitable outcome of this work for the company is the excel sheet with the calculations expressed in this thesis. The Excel sheet works as the template and the company can easily modify the numbers if needed and the results will be shown automatically.

The calculation has shown that it is realistic to target the revenue of 100 000 euros per month and the company will be able to cover all the costs and have profit in the time frame of 2 years as expect.

With the expectation that big users and medium users will spend 1.99 euros per day and 0.48 euro per day for the game, the mechanism of in-game purchase is built. After that, the price for in-game purchase is calculated.

4.2 Limitations

The first limitation is the exclusion of the time value of money in all the calculations. All the numbers used in this thesis is the number at this specific time and thus, they can be changed in the future.

Second, as free to play model game is a new idea, the numbers gathering from online sources are limited; therefore, there are some numbers used for calculation are the assumptions from the company.

Next, as there is currently no specific month when the game will officially launch, all the months in the thesis are assumed to be the same and have 30 days instead of 28 days, 30 days or 31 days as in real life. Thus, the numbers in practice can be slightly different.

4.3 Recommendations

The cost for producing this online free to play game is production costs. As the time needed to develop that game is several months, the production expense is scattered through the time. However, for this calculation, the time value of money is excluded. For further development or more careful calculation, the time value of money can be considered so that the final numbers from calculations can be more exact.

After the soft launch, which is the release of the game to a limited customers before the general public, a research can be carried out to see how the customers react to the games and from that, the company can make some modifications. In addition to that, soft launch can show if the target revenue is realistic or not, and thus, modifying the prices of the items sold in the story.

In the future, the company can consider the idea of re-play the game or library. At that time, there should be a financial projection to see how profitable those two ideas can be. In addition to that, if the company globalizes the game, the financial projection will also be important. The foreseen expense is the translation cost. And the price of in-game items can be changed, depending on the market.

4.4 Evaluation for the project and company's comment

Overall, the project went well, even though there are some difficulties at the beginning because the topic is quite new and the information available online is limited. However, after the discussion with the CEO, CFO and the production team, the author was able to get the numbers needed for calculations. Finally, the results were presented to the company in a meeting the result was satisfying.

After the project, the feedback given to the author by the representative of the company (CFO) was: "With the free2play (f2p) monetization concept preferred by the customer, we had neither theoretical nor practical experience at this time. It was essential for us to be able to estimate factors influencing the sales and revenue. The bachelor thesis by Ms. Tram

Hoang was able to cover this area comprehensively. In addition, it has integrated the individual factors into a model with formula in Excel, which allows us to incorporate new findings by simply adapting the factors and thus to project the revenues with increasing precision. The results of the work have given us sufficient certainty and we are confident to produce the game. In addition, the model will become a valuable tool in our regular success forecast. We would like to express our sincere thanks for the work done by Ms. Tram Hoang”.

4.5 Analysis of the learning

This project is both exciting and challenging for the writer. The topic for financial projection and pricing the product is not new. In theory, it simply means the forecast of the revenue and which price that needs to be set to reach the target. However, in practice, there are different kinds of products and services, so the forecast is not simple anymore.

This thesis is an interesting opportunity for the writers to know about the game industry- a new but profitable business. To sum up, the thesis is an experience for the author, to be able to combine the theory of financial projections into a real business, in this case is an online game using free-to-play model.

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