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Executing the spin-off to tackle low valuation: the case of Yahoo!

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To this School, for all the great and unexpected opportunities it gave me

Abstract

The choice of this specific topic bases on the personal preference to improve the knowledge of two particularly attractive areas: “divesture strategies” and “company valuation”.

According to the most personal opinion, the decision of divesting a business unit, a division, or the whole corporation is one of the toughest decisions a CEO has to make. By involving both emotions and rationality, divesting is a crucial choice that in many cases it changes a firm’s physiognomy irreversibly.

The specific case of Yahoo Inc. offered the opportunity to analyze a situation in which a firm that is negatively valued by the market is trying to solve the low valuation problem by spinning-off its core business. This work initially hypothesized that the spin-off was the correct course of action for Yahoo, and then tried to demonstrate it by reviewing the related literature and by running a valuation of the core business as a spun-off entity. The methodology followed in the valuation bases on the Probability DCF approach introduced by Nygard & Razaire in 1999, which was expected to bring some advantages over more classic methods such as the Discounted Cash Flow approach. This work, however, doesn’t want to show the prevalence of one method over the other.

The analysis of the literature review revealed how the spin-off can effectively solve some of the problems related to the specific case of Yahoo, while the valuation demonstrated that Yahoo’s core business, as a standalone entity, is worth more than as a part of the company.

Besides the reasons above, this work offers the opportunity to be “in the shoes” of consultants and tackle the problem under their perspective. It is one of the last news that Marissa Mayer, CEO at Yahoo since 2012, has hired consultants to solve the tricky situation.

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1. Introduction

Marissa Mayer, CEO at Yahoo Inc. ("the Company"), had announced at the beginning of 2015 the spin-off of the Company's stake in the giant e-commerce corporation Alibaba (Oreskovi A., 2015). As at December 2015, Yahoo owned about 14% of Alibaba stocks for a total value of around $32.5 Billion (Pickerdec L., 2015).

The result of this strategy would have been a separation of the Company in two parts, one which included the core business and the Company's stake in Yahoo Japan, and another part ("SpinCo") which included only the Company's stake in Alibaba (Goel V. 2015). Moreover, Alibaba would have had the chance to buy back its stocks by acquiring the entire SpinCo (MacMillan D., 2015).

With the spin-off, the Board hoped to sharpen Yahoo's focus (MacMillan D., Hoffman L., 2015), provide more clarity to the investors, compensate employees with options on the performance of the core business, and cut costs where necessary. In this way, Yahoo aimed to achieve a better valuation from the market (MacMillan D., Hoffman L., 2015).

Yahoo may be thought today as composed by three main parts: (1) Yahoo's core business, (2) Stake in Yahoo Japan, (3) Stake in Alibaba (Pickerdec L., 2015). The 35% participation in Yahoo Japan was valued by the market at $8.6 Billion on December 2015 (Pickerdec L., 2015), which if added to the market value of the participation in Alibaba ($32.5 Billion) gave a total Company market value of $40.5B (Pickerdec L., 2015). Yahoo traded at a value lower than $40.5 Billion, meaning that the core business was worth less than zero. It is peculiar that a company with approximately one billion costumers (Pickerdec L., 2015) has a negative value (Pickerdec L., 2015).

The spin-off should have provided the market with more clarity by separating the performance of Yahoo from that of Alibaba, showing that the Company was strong and that the turnaround strategy started by CEO Marissa Mayer in 2012 was producing positive results.

The Board, who initially believed to obtain the permission to execute a tax-free spin-off, eventually had to reconsider the strategy on September 2015 when the Internal Revenue System[1] declared that a normal tax rate would have been applied on gains from the transaction (Goel V., 2015). The amount of taxes to pay on the transaction is a major concern for the Company and its

[1] The Internal Revenue Service is the nation's tax collection agency and administers the Internal Revenue Code enacted by Congress (IRS, 2015).

shareholders: the taxes to pay on the sale of Alibaba shares could have a value two or three times the value of Yahoo's entire business (Lavine M., 2015), computed according to analysts' estimates of five times projected EBITDA (Pickerdec L., 2015).

In December 2015, under the pressure of activist investors, the Board announced the plan for the "reverse spin-off": the core business would have been spun off in a new entity. The reverse spin-off would generate the same final effect of separating the Yahoo's core business from Alibaba (Goel V., 2015), but saving on tax expenses (Pickerdec L., 2015). Indeed, the Company would pay $5.4 Billion in taxes, computed as the 41% tax rate on the combined value of Yahoo's core business and Yahoo Japan, rather than the $13.3 Billion expected if the first strategy would have been executed (Pickerdec L., 2015).

According to Chairman Maynard Webb, the whole spin-off process is expected to take an additional year to be completed because of complex approvals and negotiations (MacMillan D., 2015). The uncertainty is high, and the Company's stock price has dropped significantly over the last year. At today, 1st January 2016, the rumors around the Company and its failed strategy are many, and it can't be excluded that Yahoo could become a potential target for firms like Verizon (MacMillan D., 2015), which early in 2015 bought AOL, Yahoo's closest competitor (MacMillan D., 2015). Of course, Yahoo is facing one of the toughest moment since its foundation, and the 2016 will be crucial for its existence as a stand-alone firm.

2. Problem definition

2.1. The Problem

The Company is taking an important decision, and this work wants to explore some of the uncertainties involved, specifically: is the spin-off a reasonable course of action, and how much is the core business worth?

A large part of the work focuses on the analysis of the core business and its valuation since activities such as the collection of financial data, market data, and the consideration of strategic perspectives have to be carried out.

Before starting the analysis, in order to provide a clear structure to the work, an important hypothesis (*the Hypothesis*) is made:

"Yahoo Sub, a new entity which includes only Yahoo's core business, is worth more than zero".

The work is centered on trying to verify the Hypothesis, through both an analysis of the existent literature and a financial valuation of Yahoo Sub.

It is important to note that other divesture strategies beside the spin-off and the sell-off will not be taken in consideration. The work assumes that the spin-off is the only available course of action for Yahoo, and it briefly explains in the literature review section how this strategy compares to the more common sell-off.

2.2. Research Question

This work aims to address two main questions:

1. Is the spin-off a reasonable strategic course of action for Yahoo?
2. What would be the new valuation of the core business after the reverse spin-off (value of Yahoo Sub)?

The first question is tackled through an analysis of the existent literature about the spin-off as a strategic tool to uncover the value of a firm's business unit or division. An analysis of the advantages and disadvantages of the spin-off over other courses of action as the sell-off is also presented.

To answer the second question, the analysis shifts to a more quantitative approach; a company valuation is run to estimate the value of Yahoo Sub.

By answering these two questions, this work wants to provide justification for the Company's decision of spinning-off its core business, and wants to provide evidence that the core business, which at December 2015 was negatively value, will be able to achieve a positive post spin-off valuation.

3. Methodology

Easton (1995) highlights the importance for a researcher to specify the methodology she adopts in her study, which is the rationale for the use of specific procedures to analyze information applied to the understanding of a research problem (Easton, G., 1995). Generally speaking, the description of the methodology allows who reads to assess the overall validity of the work.

The discussion is organized in four points: the scientific view, the research approach, the case approach, and the structure of the work.

3.1. Scientific view

Besides stating the methodology, all researchers should specify their epistemology, which is the philosophical basis for claiming to know what they know and the substantive basis for their knowledge claims (Easton G., 1995). By clarifying her epistemological orientation, the researcher explains "what is she trying to do when she does the research". Among the several philosophical orientations that can be found in the literature, researchers often refer to two of them: positivism and constructivism (Easton, G., 1995).

Positivism primary refers to the idea that an explanation must come out from empirical data. Positivists accept the conclusion that the "unobservable" must be refused, since it can't be drawn any conclusion that doesn't come out from data. They firmly believe in regularity and covariation, and they are able to identify patterns in data by applying statistical knowledge. However, even if they are able to identify those patterns, they can't explain why they occur (Easton G., 1995).

The constructivism, on the other hand, poses its foundation on the idea that the knowledge of the word is a fabrication made by humans, and each individual identifies as knowledge what he chooses to accept as knowledge (Easton G., 1995). This is a completely opposite view to the positivism, and it has several implication on the research field. According to constructivists, the process of data collection is influenced by the individual's perception of the word, while the analysis and interpretation of the data is biased by the use of the language, which is a "socially conditioned tool" (Easton G., 1995).

It can be concluded that this work adopts a constructivist approach. Indeed, the analysis of the spin-off decision and the valuation of Yahoo Sub bases on the use of secondary sources of data and the judgment of the practitioner in making important assumption about the future performance of the

firm. Consequently, the process of data collection and the final conclusions of the work are based on the individual's perception of knowledge. In other words, another individual could have either collected data in a completely different way according to her knowledge of what is relevant or not to the case, or interpret the same results in a different way.

For the reasons above, this work adopts a constructivist approach and in any way relates to positivism.

3.2. Research approach

Scientists and philosophers have continuously debated over the past years about the acceptance of the "method of hypothesis" (Laudan, L., 1981). In the literature, it is common to distinguish between two possible general methods used to confirm the hypothesis. The first method is the "inductivist" method, according to which the hypothesis can be proved by observations only if it is possible to obtain the hypothesis by induction from the observed data. Induction can consist, for instance, in enumeration or elimination process, and it can either establish that the hypothesis is true or that the hypothesis is probable even if not certainly true (Laudan, L., 1981). The second method of confirmation is the "hypothetico-deductive" (abductive) method. According to the abductive method, the hypothesis has to be considered as an instrument that helps to explain the available data; the hypothesis has to be used to anticipate "observable correlations not observed prior to the formulation of the hypothesis" (Laudan, L., 1981). Ultimately, the hypothesis is confirmed if, and only if the correlations are found in the data (Laudan, L., 1981).

This work can be classified neither as purely inductive nor as purely deductive. Indeed, if on the one hand it doesn't want to expand or formulate a new scientific theory, on the other hand it doesn't use the hypothesis to anticipate the result of a pure statistical analysis. However, if a classification of this work had to be made, the deductive approach would be chosen: by formulating the hypothesis that the spin-off will have a beneficial effect, the analysis of the literature and the financial valuation methodology are used to prove that the hypothesis is true.

3.3. Case approach

The case study can be defined as "an empirical enquiry that investigates a contemporary phenomenon within its real life context and in which multiple sources of evidence are used" (Easton G., 1995). The genre of evidence that can be used in a case study can be both qualitative and quantitative, with the only limit that it has to be defined in time and space coherently with the study.

It is interesting to analyze the case study according to the two epistemologies introduced above, positivism and constructivism. Positivists would look at the case study as a single instance among the many possible cases, judging its effect as marginal. Indeed, as explained above, positivism is very much about using statistical inference on a large and significant sample of numerical data to draw conclusions (Easton G., 1995). Moreover, all the qualitative data used in a case study should be converted into a metrical form in order to provide meaning to who adopts a positivist approach. On the other hand, constructivists, would claim that a case study is subjective since it is influenced by the perception of knowledge of who has written it. The same case study could have been written in several different ways, all with different value, highlighting the absence of one single truth to discover (Easton G., 1995).

Even in modern literature, the case approach finds several limitations. According to Hodkinson, P., & Hodkinson, H. (2001), the first limitation of this kind of approach is that the conclusion drawn from a particular case usually can't be extended to other cases, making researchers to perceive these findings as of little value. A second important limitation is that the case study relies on the researcher knowledge and intuition. Therefore, the quality of someone judgement and intuition strongly affects the quality of the case study, making experts claim case studies to lack objectivity.

Besides the limitations highlighted above, the reasons that justify the selection of the case approach for this work are strong and at the basis of the primary motivations for the topic. The first reason why this topic has been selected was not to show that the spin-off is an effective tool for managers to face low valuation issues, but whether this strategy is effective in the real and contemporary case of Yahoo. This work has to be seen as a tremendous opportunity to put in practice what the literature expects about the spin-off strategy, and verify whether and how the expected results occur for Yahoo. As it will be pointed out in the Literature Review part of this work, previous researchers have largely described and analyzed through correlations the positive effect that the spin-off strategy might have on firms to which is applied. The literature is one of the qualitative sources of evidence used to solve the case of Yahoo.

3.4. Structure

In this section, an explanation of the process followed during the analysis is shown. The steps shown in "Figure 1" have been rigorously observed during the activity of solving the case, and they have been carefully developed in order to plan a very efficient and effective way to get to the solution.

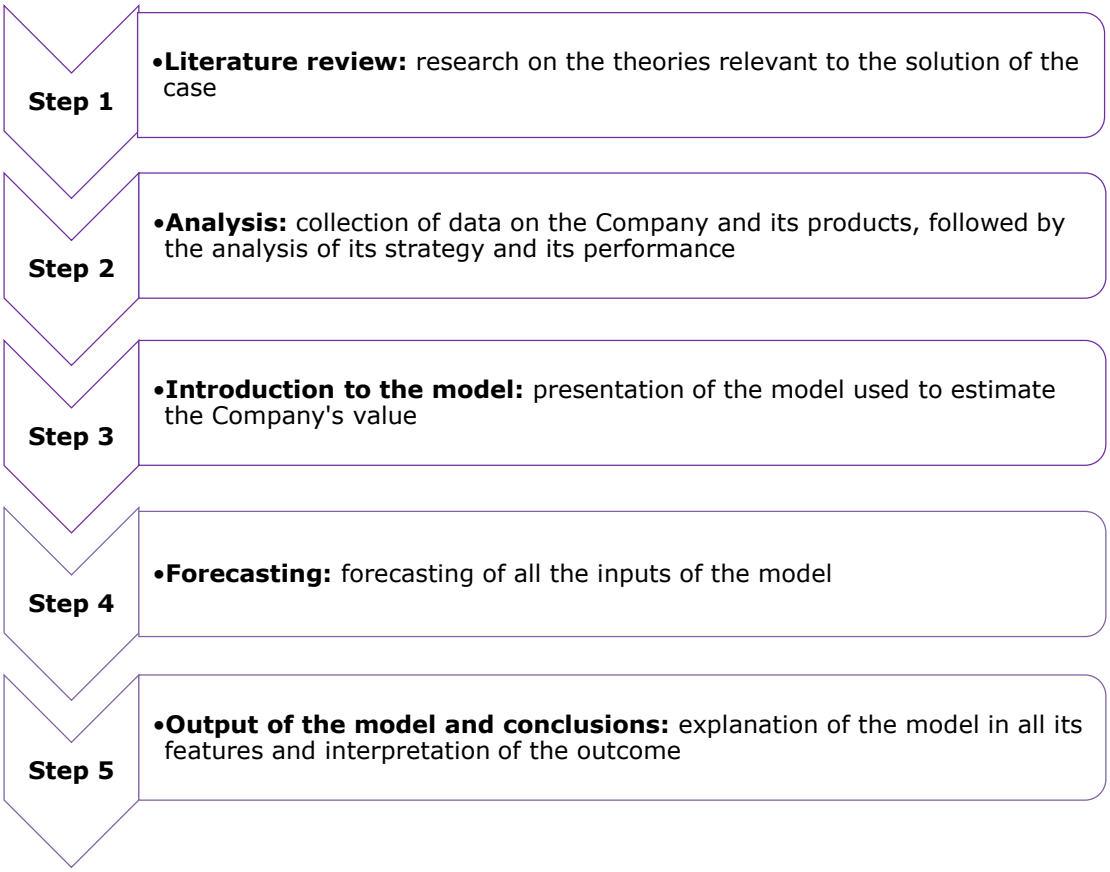


Figure 1. Approach to the analysis. *Source: Own construction.*

Step 1, "literature review", collects the theories relevant to the case such as the spin-off strategy and the Probability DCF. The findings of this part are essential to prepare the ground of the analysis.

In ***Step 2***, the analysis initially focuses on analyzing the Company and collecting the data relevant to the case. Once all the basic information about the Company, its history, and its evolution through the time are given, each of the "pieces" of Yahoo are presented: core business, Alibaba Stake, and Yahoo Japan Stake. Special attention is given to the core business, whose products, services and business model are carefully analyzed.

After this overview, the focus moves on the analysis of the Company's performance and strategy for the last years. Great attention is given to the time-frame 2012-2015, when Marissa Mayer has tried to turn-around and innovate the Company's business. This step is of great importance for making reasonable assumptions for the valuation.

Step 3 introduces the model used to estimate the value of the Company. Besides accurately describing the theories behind the model, this step explains "why" it is chosen and which advantages it offers over the many other methods available.

Step 4 naturally follows Step 3 in showing the main inputs of the model. The focus is on forecasting the Company's income statement and balance sheet, and on developing specific assumptions for the methodology such as the long term growth rate of the revenues and the discount rate. This step prepares all the ingredients for the last phase of the analysis.

Step 5 logically concludes the analysis. It combines all the information created in the previous steps to estimate the final output of the work: the intrinsic value of Yahoo Sub. The model, built in Excel and run using Palisade[2], it is explained in all its peculiarities.

The output of the model provides the proof used to verify whether the Hypothesis is true, and it allows to draw the conclusions of the work.

[2] Palisade Corporation develops @RISK ("at risk"), DecisionTools Suite and other software for risk analysis and decision making under uncertainty (Palisade.com, 2015).

4. Literature review

In this chapter, two notions are introduced: the "spin-off", and the "Probability Based DCF". Although other theories are used to solve this case, their discussion will be postponed to the chapter of the analysis, precisely to the point where their knowledge is applied. This particular disposition wants to provide who reads a more flowing discussion.

4.1. Spin-off

The expression "spin-off" refers to the firm's process of creating a separate publicly traded firm through the distribution, on a pro-rata basis, of the firm's shares in its subsidiary (Hite, G. L., & Owers, J. E., 1983). In other words, a spin-off has two effects: it creates a new firm (subsidiary), and the asset base of the "divestor" (parent) decreases by the amount transferred to the new entity. Ultimately, the shares of the new created firm are distributed to the original shareholders of the parent firm in proportion to their participation in the parent firm. If synergies are absent, the sum of the post spin-off cash flows of the parent and its subsidiary must equal the combined cash-flow pre spin-off (Hite, G. L., 1983).

There are many possible reasons behind the decision to execute a spin-off.

The first reason to execute a spin-off is the manager's need of solving the *i. information asymmetry* between the firm and the market. Information asymmetry could, indeed, prevent the market from correctly valuing the firm and understanding its business (Bergh D., Johnson R. A., & Dewitt R., 2008). A spin-off can provide investors with more clarity by putting in light the cash flows and the operating efficiency of an individual division of a firm (Bergh D., 2008).

Conglomerates usually include several types of assets or businesses that for the manager make strategic sense altogether, but that for the market are very hard to understand (Bergh D., 2008). The spin-off, by separating a part of a firm, can clarify the interactions and the strategic reason that linked it to the rest of the firm (Bergh D., 2008). Overall, by enhancing the *ii. clarity* and the transparency, the spin-off can be an effective course of action to make investors improving their valuation of the firm (Bergh D., 2008). Indeed, the better processing of information of the individual divisions would make the sum of their values greater than the value of the combined firm (Krishnaswami, 1999).

According to Morgan Stanley (2011) the spin-off has been proved to be very effective to solve the issue of the *iii. conglomerate discount* (Morgan Stanley, 2011). The conglomerate discount is a problem which affects multi-divisional companies. Because of the value destruction deriving from

the diversified structure and methodological problems in error measurement (Burcha T. R., Nanda V., 2003), the market applies a discount to the value of the firm (Burcha T. R., 2003). Investors are usually skeptical about diversified companies since these are often found to overinvest in business units with scarce opportunities (Burcha T. R., 2003). Besides the overinvestment argument, the lower valuation for multidivisional firms can be also explained in terms of agency problems between divisional managers and corporate headquarters (Burcha T. R., 2003).

The spin-off can tackle the conglomerate discount in several ways: it promotes transparency to the market, it attracts new investors focused on the specific industry of the spun-off entity, and it pushes to the design of better financial policies for the new entity (Morgan Stanley, 2011).

On the other hand, it is important to note that the spin-off transaction does not come without any costs. As Hite (1983) points out, registration of the new firm, the distribution of its shares, duplication of costs associated with dividend payments, and lost synergies, are only few of the costs that should be weighed against the benefits of executing a spin-off (Hite, G. L., 1983).

Ultimately, it is relevant to consider that the spin-off, differently from other divesture strategies, is a zero cash transaction. As a consequence, the desire to generate cash to pay off the debt can't be a motivation for the management to execute a spin-off (Krishnaswami, Subramaniam, 1999).

The decision to undertake a spin-off it is not always straightforward for the manager, who can take in consideration several other options to obtain the separation of two divisions. According to Moschieri and Mair (2011), the most common types of divesture are six: spin-out, sell-off, carve-out, leveraged buyout, spin-off, and split-off (Moschieri C, Mair J., 2011). Each of them has specific advantages and disadvantages with different implications on the final result. The management chooses the course of action that, in general, responds more coherently to the reasons to start a divesture.

For the aim of this work, in this section the spin-off is compared only with the sell-off strategy. According to Hite (1983), sell off and spin-off are the two most popular forms of divesture.

The literature on the choice between the spin-off and the sell-off is robust. According to Jain (1986), a sell-off occurs when a firm sells some of its assets, such as a division or a business segment, but keeps existing in essentially the same form (Jain P. C., 1986). In other words, the sell-off is very simple and straightforward solution consisting in the sale of the company to a buyer or a group of buyers (Jain P. C., 1986). This aspect makes the sell-off very appealing to the managers, but it can

have several drawbacks which are important to consider. First of all, the specific use of the assets may find a very poor market for sale reducing the number of potential buyers (Bergh D., 2008). Secondly, the profound strategic insights that the assets might contain can turn out dangerous if in the hands of competitors (Bergh D., 2008).

The spin-off, on the other hand, do not present these drawbacks and it is still able to bring benefits as reducing the organization complexity, eliminating information asymmetry, lowering agency costs, and improving the earnings with the result of a higher valuation (Bergh D., 2008).

According to Bergh and Sharp (2015), the preference of one option over the other is related also to the size of the divested unit: the larger the unit, the higher is the likelihood that a spin-off is chosen (Bergh D., Sharp B. M., 2015). Sell-off, on the other hand, is preferred when the unit is small and the management wants to generate resources to use for the pursuit of other objectives (Bergh D., 2015).

Lastly, it is important to look at the result that the spin-off has had in the past. The literature documents a positive stock price return when a company announces a spin-off (Krishnaswami, 1999). A recent study of Morgan Stanley associates the spin-offs with important increases in valuation multiples, and with share price outperformance for the parent company (Morgan Stanley, 2011): for the period twenty days "post and pre" spin-off announcement, the excess stock return for the parent companies has been on average 2.5% (Morgan Stanley, 2011). Furthermore, according to Krishnaswami and Subramaniam (1999), this effect has been documented to last even in the long term. The reasons behind this phenomenon are mostly found in the higher focus of the company, the removal of negative synergies, and the regulatory advantages (Krishnaswami, 1999).

4.2. Probability Based DCF

The Probability Based DCF (Nygard W., Razaire C, 1999) builds on the idea of the more common Discounted Cash Flow (DCF) model. This model finds large foundation in the literature, and it is recognized as one of the most valid approaches to companies' valuation. Below, a brief overview to the DCF model is given as introduction to the Probability based DCF.

4.2.1. Introduction to DCF approach

Traditional valuation approaches, such as the Discounted Cash Flow Method (Nygard W., Razaire C, 1999), lead analyst to single-value estimations which are not very representative of the reality (Nygard W., 1999).

The DCF method is frequently used to estimate the enterprise value since it is one of the few methods conceptually correct (Fernandez P., 2015). The basic idea is that it is possible to find the value of a company by discounting the cash flows it will generate in the future at a discount rate that reflects their risk (Fernandez P., 2015). This general approach has had in the past several modifications, leading to several different methodologies that practitioners use in base of the specific situation. In general, all the modified approaches share the basic idea, which can be summarized in the following equation:

$$V = \frac{CF_1}{1+k} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n + VR_n}{(1+k)^n}$$

Equation 1. DCF approach. *Source: (Fernandez P., 2015)*

where CF is the cash flow generated in each period from 1 to n, k is the discount rate that matches the risk embedded in the cash flows, V is the value of the entity being evaluated, and VR is the residual value of the entity at period n (Fernandez P., 2015). As it can be observed, the last addend of the equation estimates the residual value, which is the value of all the cash flows beyond the explicitly forecasted period. The residual value is computed by applying the following equation:

$$VR_n = CF_n \frac{(1+g)}{(k-g)}$$

Equation 2. Residual value. *Source: (Fernandez P., 2015)*

where g is the long term growth rate at which cash flows keep growing after period n (Fernandez P., 2015).

Each of the inputs introduced above has to be carefully estimated by making reasonable assumptions. Cash flows are estimated through the precise forecast of each financial item, such as revenues and operating expenses (Fernandez P., 2015). A specific type of cash flow is the "Free Cash Flow", of which more detail is given in the part the analysis. Once the cash flows have been estimated, the practitioner has to find the values of the discount rate and the long term growth rate to use in the analysis (Nygard W., 1999). Though the computation of the discount rate is a rigorous process abundantly described in the literature, the correct estimation of the long growth rate is often based on assumptions, whose validity has a tremendous impact on the appraised value (Nygard W., 1999).

4.2.2. Probability Based DCF approach

According to Nygard and Razaire (1999), using a single value as the input for the valuation can be quite hazardous, while using a range can produce a better representation of a company's market value (Nygard W., 1999). In this perspective, they wanted to develop a model whose output was a range and not a single value. Nygard and Razaire named this effort the "Probability-Based DCF" (PB-DCF) (Nygard W., 1999). This method, although it shares the fundamental assumptions of the more classic, and widely adopted Discounted Cash Flow Method, innovates the existent theory by substituting single value inputs with range inputs (Nygard W., 1999). The final output of the PB-DCF approach is a graph which shows a range of values distributed along a probability curve (Nygard W., 1999). Nygard and Razaire developed this method thinking to the improvement of valuations in the field of real estate, and in their paper (1999) they describe the process they adopted to value a community shopping center.

According to their view, the PB-DCF proves to be very effective in overcoming some of the shortfalls that the classic DCF approach has (Nygard, 1999).

First of all, in the classic DCF approach a practitioner must choose one among an infinite number of scenarios when selecting the major inputs (Nygard W., 1999). According to Nygard and Razaire this step inaccurately assumes that the practitioner, once considered all the factors, is able to pick the most realistic scenario from the many available (Nygard W., 1999). As a result, most likely the practitioner will not select the right scenario.

The second important limitation of the classic DCF approach is that, in case of two equally probable scenarios, the practitioner has to select the one that according to his judgment is the most likely (Nygard W., 1999). This is very important when one of the scenarios in object refers to an

important event which can strongly affect the project's success, or the company's survival. Picking only the scenario which has a slightly higher probability to occur, can lead to a major mistake in the valuation in case the discarded event occurs (Nygard W., 1999).

The third, and last major shortfall of the DCF refers to the final output of the valuation. Nygard and Razaire highlights that the DCF produces a single value without any certainty (Nygard W., 1999). Moreover, in case of a bidding process, where frequently happens that the bidder is still interested in the acquisition even if the proposed price is higher than the one estimated through the DCF, it is hard to advise the investor how safe is to bid that higher price (Nygard W., 1999).

The PB-DCF overcomes those issues by allowing to use range of values as input for the valuation, and producing output in the form of values distributed over a probability curve (Nygard W., 1999).

5. Yahoo (the "Company")

5.1. History

The Yahoo search engine was created in 1994 by David Filo and Jerry Yang, both engineers at Stanford University, who immediately where able to sell advertising space on their creation. Yahoo went public in 1996, and in the same year with the help of Softbank it was able to expand outside the United States with the creation of Yahoo Europe and Yahoo Japan. In the following years the Company grew mainly through acquisitions, extending its services' offer to eCommerce, internet scheduling, internet marketing, and internet phone (MarketLine, 2015).

Very important was the acquisition in the 2000 of "eGroups" which allowed the company to enter the e-mail business, one of the most renowned services which the Company offers today. In 2002, Yahoo approached the Indian market launching Yahoo India and, in the same year, it started providing messaging services for mobile phones and PCs by collaborating with AT&T[3] (MarketLine, 2015).

In 2003, together with BT[4], the Company launched its first DSL system in the United Kingdom. In 2005, an alliance with Roger Cable[5] was essential to provide Canada with broadband internet access, and the acquisition of Kelkoo was extremely important for the enhancement of the Company's advertising system. Flickr, a photo management and sharing provider, was acquired in the same year. In 2007 Yahoo acquired three companies: Rivals.com, to reach the college and high school community interested in sport, Right Media, to improve online advertising, and Zimbra, to perfect the mail service (MarketLine, 2015).

In 2008, the Company invested in the 1% of Alibaba.com, the giant e-commerce platform, for a price of around $101 Million in occasion of the IPO on the Hong Kong Stock Exchange. Yahoo reached for the first time the mobile segment by partnering with Samsung and LG, which agreed to provide Yahoo's services on their new products (MarketLine, 2015).

[3] AT&T Inc. (AT&T) is a provider of telecommunications services to consumers in the US, and to businesses and other providers of telecommunications services worldwide (MarketLine, 2015).
[4] BT is a communication company, serving the broadband, phone, TV and mobile needs of customers in the UK and worldwide (BT Official website 2015)
[5] Today it is known as Rogers Communications, Inc. (RCI), and it is a diversified communications and media company. The company is engaged in providing wireless voice and data communications services; and cable services (MarketLine, 2015).

The Company started exploring new revenue's opportunities in the search and display advertising segment. The acquisition of Maven Network enhanced Yahoo advertising experience by offering a new online platform for video advertising, and in 2009 it launched Yahoo Mobile, an application developer for Apple iPhone, Nokia[6] smartphone, BlackBerry, Sony Ericsson and Motorola. At that time, the Company invested heavily in R&D for cloud computing expanding its partnerships with major academic institutions in the United States. In the same year the Company started collaborating with Microsoft by establishing an agreement under which Microsoft would have used exclusively Yahoo for paid search services (MarketLine, 2015).

In 2010 Yahoo continued focusing on partnerships to sustain growth; the Company could sell its services on Samsung and Nokia devices globally. Moreover, it introduced its mail and messaging system on mobile platforms (MarketLine, 2015).

In 2012, besides the launching of Genome, the new online advertising product for more tailored marketers solutions, the Company made a plan to dispose about Alibaba shares: the Chinese company would have repurchased 20% of its shares valued at around $7.5 Billion, and Yahoo would have designed a framework for the monetization of the remaining shares (MarketLine, 2015). In the same year, Marissa Mayer became the CEO of the Company, the fifth CEO in the last five years (Efrati A. & Letzing J., 2012). Marissa Mayer, former Google vice-president, was chosen with the intent to bring someone very skilled and very familiar with consumer websites. Indeed, she was among the very first employees at Google, and her strong contribution to the design of the successful search engine attracted the attention of many in the Sylicon Valley (Efrati A. & Letzing J., 2012). As soon as she became CEO, she announced that the advertising would have continued to be the primary form of revenue for Yahoo (Efrati A. & Letzing J., 2012).

As in the previous years, the 2013 was characterized by partnerships and acquisitions. The Company acquired Alike, integrated Dropbox service in its mail service, and acquired Tumblr**,** a blog-hosting website (Yahoo annual report, 2015), to increase the number of customers from mobile platforms. The acquisition of Tumblr was the most expensive in Company's history; it paid approximately $1.1 Billion recognizing $750 Million as goodwill (Yahoo annual report, 2015).

[6] Nokia is a provider of telecommunications network infrastructure, location-based technologies and advanced technologies. The company has operations across North America, Europe and Asia. It is headquartered in Espoo, Finland (MarketLine, 2014).

In 2014, Yahoo kept focusing on revenues from mobile by launching new products and services for smartphones, improving the platform for the advertisers, and acquiring Blink ad Flurry. Together with the acquisition of BrightRoll, an online programmatic video advertising platform, Blink and Flurry enhanced the costumers' experience on Yahoo properties through mobile.

To improve the revenues from "search advertising", the Company signed a five years partnership with Mozilla Firefox (MarketLine, 2015). This agreement made Yahoo the default search engine for Firefox users, guaranteeing the Company an increase in the number of costumers' unique visits on its properties. This benefit doesn't come without cost: Yahoo pays a yearly fee, which in 2015 was approximately $375 Million (Yahoo annual report, 2015).

At the beginning of the 2015, in a letter to the shareholders, Marissa Mayer announced that the Company authorized a spin-off of the remaining stake in Alibaba to form a new independent company (Yahoo Press release, 2015). This plan would have been executed before the end of the year. However, the Company didn't receive the approval from the Internal Revenue Service to execute a tax free spin-off, and at December 9th, 2015 the Board reconsidered its original plan and announced a reverse spin-off (Yahoo press release, 2015). According to what reported in the 2015 annual report, the Company plans to spin-off its core business into a new entity before the end of the 2016. The resulting corporation will have a more narrow scope, focused in developing high growth areas and extremely efficient in managing its resources (Yahoo annual report, 2015).

The disappointing financial results of the 2015, and the unaccomplished target have added a lot of uncertainty on the future of the Company. On July 2015, TRC Capital Corporation offered to buy up to three million shares of the company in a cash. A sale of the Company for a generous valuation it is a strategy that the Board may consider as a valuable alternative to the spin-off. Therefore, lots of uncertainty remain on whether Yahoo will execute the reverse spin-off.

5.2. The Company and its Parts

As anticipated above in this work, the Company can be decomposed in three parts: the stake in Yahoo Japan, the stake in Alibaba, and Yahoo's core business. A brief introduction to each of them is provided in the following paragraphs.

5.2.1. Yahoo Japan

Yahoo Japan Corporation (Yahoo Japan), born in 1996 as a joint venture between Softbank and Yahoo, is an online portal for advertising, e-commerce, and other businesses. It is organized in three business areas: marketing solutions, consumer, and other (MarketLine, 2015). Marketing solutions offers services related to advertising and paid digital content for search and display advertising (MarketLine, 2015). Consumer segment is focused on e-commerce and membership services on websites such as Yahoo! Shopping and Yahoo! Premium, while "other" offers online payment services (MarketLine, 2015).

Overall, Yahoo Japan, seems a good investment for the Company. Even if it doesn't show a strong growth, its performance it is quite satisfying and its financial results have been stable through the last years. At March 2015, Yahoo Japan registered Revenues of approximately $4 Billion, an increase of 5% over the FY2014. The operating profit in FY2015 was around $1.8 Billion (+0.4% over the FY2014), while the Net Income was approximately $1.2 Billion (+3.5% over the FY2014) (MarketLine, 2015).

At December 2015, Yahoo ownership stake in Yahoo Japan was worth approximately $8.3 Billion, corresponding to a percentage ownership of around 35.5% (Yahoo annual report, 2015). Cumulative earnings from the Company's interests in Yahoo Japan were around $3.3 Billion and $3.7 Billion in 2014 and 2015 respectively (Yahoo annual report, 2014).

5.2.2. Alibaba

Alibaba Group Holding Limited (Alibaba), founded in 1999 by Jack Ma (executive chairman and member of the board), is a Chinese online marketplace in retail and wholesale. It is headquartered in Hangzhou (China), and counted around 22 thousands employees at March 2014 (MarketLine, 2015). Since the 2007, Alibaba.com is listed on the Hong Kong Stock Exchange.

Although Alibaba's major markets are China and Hong Kong, this company has been able to build a worldwide footprint and today it is recognized globally. Important offices are in India, Japan,

the UK, Korea, and the US (MarketLine, 2015). The fact that Alibaba is very focused on its business is demonstrated by the fact that "mobile and online commerce" is its only business segment.

Alibaba's performance in the last years has been impressive: Revenues in FY 2014, driven by the growth of the business in China, were $8.5 Billion, an increase of 52% over the previous year. The operating profit was around $4 Billion, approximately a 50% margin on Revenues. This number is even more surprising if compared with the previous year figure of $1.7 Billion. The net income in FY 2014 was $3.8 Billion, almost 70% more over the FY 2013 (MarketLine, 2015).

The beginning of the relationship between Yahoo and Alibaba is dated back to the 2005, when the Company acquired 46% of the shares of Alibaba Group for $1 Billion in cash (Yahoo annual report, 2014). In 2012, the two firms agreed on a repurchasing plan, and during September of the same year Alibaba repurchased 523 million of its shares from Yahoo (Yahoo annual report, 2014). The Company received approximately $7 Billion from the sale, of which $6.3 Billion in cash and $800 Million in Alibaba Group Preference Shares. The Preference Shares produced around $60 Million in dividends for Yahoo before they were redeemed on May 2013 (Yahoo annual report, 2014).

In occasion of Alibaba's IPO of American Depositary Shares (ADSs) on September 2014, the Company received $9.4 Billion in cash that was recorded as "other income" in the income statement at December 2014 (Yahoo annual report, 2014). Ultimately, at December 2014 the Company remained with 384 million shares of Alibaba, approximately a 15% ownership stake (Yahoo annual report, 2014). Following the IPO, according to a different accounting method Yahoo doesn't report the Alibaba stake under "investments in equity interest anymore".

5.2.3. Yahoo's Core Business

Yahoo Inc. is headquartered in Sunnyvale, California, and at December 2015 it counted 10,400 employees distributed in offices all over the world.

Yahoo has pursued an inorganic growth strategy. As highlighted above in this work, the Company acquired many promising ventures, and agreed on several partnership to enter new businesses and generate grow. At December 2014, the Company's service offer was so wide that listing all the services one by one might have resulted spurious. The unnecessary "complexity" increases the information asymmetry, and it is interpreted negatively from the investors who, consequently, apply a discount to the value of the firm (Bergh D., Johnson R. A., Dewitt R. 2008).

In 2015 the Company have tried to re-organize in a more simple way its products, which in the last annual report are identified as grouped in three business segments: "Search", "Communications", and "Digital content" (Yahoo annual report, 2015).

The Search segment includes all those services connected to Yahoo search engine. The challenge in this area is to provide users with personalized contents to improve their experience and make them spending more time on Yahoo. In 2015, Yahoo launched a new search system for mobile that is expected to improve the search experience on mobile (Yahoo annual report, 2015). The main revenue stream of this segment comes from "*search advertising*". These revenues are generated when users click on sponsored search results which link to advertisers' websites. For every "Click", the Company collects a fee (Yahoo annual report, 2014). The partnerships with Mozilla Firefox, Microsoft, and Yelp support Yahoo in growing the number of users and increasing the revenue from Paid clicks.

Communications is the segment that provides users with products that connect each other. In 2014, these included Yahoo Mail, Yahoo Answers, Yahoo Game Network, and Yahoo Weather. Today, the offer is simplified and reduced to Yahoo Mail and Yahoo Messenger (the instant messaging service). Revenues generated from this segment are recognized in "*other revenues*" (to not confuse with Other Income), which include also the royalties from Yahoo Japan and Alibaba (Yahoo annual report, 2014).

The infinite list of products that the Digital content segment included in 2014, such as Yahoo Tech, Yahoo Food, Yahoo Finance, Yahoo Travel, and Yahoo Sports (Yahoo annual report, 2014), has also been simplified. Now the segment comprises Tumblr, and four core areas: News, Sports, Finance, and Lifestyle (Yahoo annual report, 2015). On these pages, advertisers pay the space to show their graphical or non-graphical commercials. This is known "*display advertising*" (Yahoo annual report, 2014), and the Company distinguishes it in four types: Native, Premium, Video, and Audience (Yahoo annual report, 2015).

The Company offers advertisers the opportunity to reach targeted costumers by leveraging on all the data and analytics that Yahoo owns. The Company has invested during the last years in developing new areas of investment called *Mavens* (mobile, video, native, and social) (Yahoo annual report, 2014). Growing Mavens revenues has been identified as one of the primary objective of Yahoo for the future (Yahoo annual report, 2015). Revenues from Mavens are growing at a very fast paced and Yahoo recorded $1.1 Billion for the year 2014 (Yahoo annual report, 2014). The Company

simplified the offer to the advertisers by developing Yahoo Advertising and Yahoo Gemini, two platforms that contain a wide range of offer of the different types of advertising (Yahoo annual report, 2014). Furthermore, the two acquisitions of Flurry and BrightRoll have improved respectively the data analytics service and the video advertising (Yahoo annual report, 2014). The main result accomplished by this strategy has been growing the number of monthly users to 1 Billion in 2014 (Yahoo annual report, 2014).

6. Analysis

6.1. Strategic analysis

The strategic analysis is very important because it provides support to the assumptions embedded in the financial model developed to assess the value of Yahoo. Indeed, by understanding the strategy of the Company, the likelihood to pick more reasonable assumptions increases. It is extremely harmful for the valuation to assume something that it is inconsistent with the Company's strategy: such mistake could lead to a totally wrong result.

As a first step to understand Yahoo's strategy, its annual report is screened. It emerges that the Company is extremely focused on trying to increase its revenues from the Mavens offering through the improvement of existing products and the development of new advertising services for mobile platforms. The Company seems very concerned about its ability to attract customers from mobile, identifying this competence as crucial for its sustainability. A failure of the mobile strategy may compromise the whole business, and it may advantage those competitors who already have an established mobile presence. Yahoo has moved a bit late into the mobile segment, and it is dedicating a great amount of resources to catch up the first movers.

The share of revenues from search advertising has constantly increased over the last few years, representing together with that of revenues from display advertising the 84% of total revenues. In order to ensure the growth of these two revenue streams, Yahoo needs to constantly innovate, introduce new products, expand the advertising base offer, develop a competitive sale strategy, and monetize mobile queries. Besides attracting new customers, the main target is to push them to spend always more time on the Company's Sites. In 2014, the Company reported that the number of users on mobile touched 800 million in 2014, doubling the number of the 2012.

Since Marissa Mayer became the CEO, she immediately started to implement changes. She introduced a new Company logo and started hiring engineers specialized on mobile, bringing their number from forty to almost four hundred (Baer D., 2014). She expressly said that what she wanted was a "new website, focused on technology, extremely social friendly", and that was able to drive traffic back to Yahoo's platform (Baer D., 2014). Furthermore, she started an aggressive inorganic growth acquiring more than forty startups directed at reaching three objectives: acquire talents, empower Yahoo's existing products, and reach a new demographic (Baer D., 2014).

Recognized the Company's lack of presence in many important growth areas, Marissa Mayer decided to start partnerships with some of the Company's competitors as Apple, Google, and Facebook (Baer D., 2014). Turning competitors in partners may benefit the Company more than directly fight them.

Although the strategy seems very promising and reasoned, last year results do not suggest that the strategy has obtained the desired results. Indeed, in the 2015 annual report the Board announced the plan to extremely simplify the Company, redefining the product portfolio, and divesting all those assets that are no core to the business. It is also in the plan to dramatically reduce the workforce, and close five offices outside the US (Yahoo annual report, 2015).

As a result, the post spin-off firm that this work aims to analyze will be a focused entity, extremely oriented toward efficiency.

The remaining of the analysis is organized according to two widely used frameworks, whose validity has been largely documented in the literature: the PEST analysis, and the Porter's Five Forces framework. While the PEST (Political-Economic-Social-Technological) is oriented at analyzing the macro environment (Recklies, D., 2006), the Porter's Five Forces framework is useful to assess the competitive forces in the industry (Porter, M. E., 2008). Note that, since the analysis of each of the factors might result spurious and unnecessary to the purpose of this work, only key areas are discussed. Overall, the aim of this chapter is to assess whether Yahoo strategy is consistent with its external environment and the competitive forces that shape its industry.

With the aim to provide a clear and more complete overview of the firm's strategy, the findings of the two frameworks will be ultimately summarized according to the "Strengths-Weaknesses-Opportunities-Threats-SWOT" analysis (Grant, R. M. 2010), a widely recognized tool for firm's strategy assessment.

6.1.1. PEST analysis

The PEST analysis is an effective tool to identify and assess how the external environment can affect an organization or the whole industry (Recklies, D., 2006). It classifies the factors affecting the macro environment in four groups: political, economic, social, and technological. In the case of Yahoo, three of the four areas are explored: Economic, and Technological. The social area is not discussed in this section because of the lack of relevant information.

An important economic factor recognized in Yahoo is the instability of *currency exchange rates*. The Company's revenues generated outside the US are denominated in the local currency. Therefore, the consolidated US dollar financial statements are exposed to fluctuations of currency exchange rates since all the revenues generated abroad have to be converted in US dollars (Yahoo annual report, 2015). The Company partially overcome this issue by entering derivative contracts to limit the effects of an unfavorable move in the foreign currency exchange rates (Yahoo annual report, 2015).

Among the technological factors, the most important in the case of Yahoo seems to be the improvement in technology that allows advertisers to more effectively exploit *mobile platforms*. The more the experience on mobile improves, the more customers will access the internet through their mobile phones. Industry estimates suggest that the market of smartphone will continue to increase at a double digit rate over at least the next three years. The proof that this trend is shaping Yahoo's strategy is shown by the fact that the Company has launched many products and services on mobile, and has acquired small companies to enhance the users' experience on this kind of platform. The Company, as already highlighted above, was also able to launch an aggressive mobile strategy which has grown the number of mobile users exponentially over the last three years. The availability of financial resources allowed Yahoo to enter the mobile segment relatively fast to establish and attract new users. The possibility of the Company to access resources easily and to grow inorganically is certainly an advantage over small size competitors.

The most important political factor affecting the Company's strategy is the *regulatory framework* that regulates the industry. As many of the businesses on the internet, the Company is exposed to state and international laws on the protection of user data. The Company may suffer unexpected lawsuits or changes in the regulation that limit the access on Yahoo Properties.

6.1.2. Porter's Five Forces analysis

The Porter's Five Forces framework identifies five forces that drive the competitiveness of an industry: rivalry among existing competitors, treat of new entrants, bargaining power of buyers, bargaining power of suppliers, and the threat of substitute products or services (Porter, M. E., 2008).

The level of competition in the online advertising market is very high. The number of companies producing content on the internet is enormous, and advertisers have a wide selection of websites where to promote their products. According to Morningstar (2015), Yahoo's main

competitors are Alphabet Inc., Facebook Inc., Baidu Inc., Naspers Ltd, JD.com Inc., LinkedIn Corp, NetEase Inc., Twitter Inc., TripAdvisor Inc. Margins, as will be highlighted in the remaining of this work, are squeezing, and the ability to reduce costs enough to keep a good level of profitability will be critical in this industry.

Barriers to entry in the internet information providers industry are relatively low. Indeed, the cost of creating and maintaining a website is not high since fixed costs and initial investment are low. On the other hand, the ability to attract enough customers is crucial to effectively compete with the big players of the industry. As a result, although the threat of new entrants is existent, it doesn't directly affect the Company's strategy, at least in the short term. The Company counted 1 billion monthly active users in 2014, an increase of 20% over the previous year (MarketLine, 2015). This number has not decreased over the 2015, and it is expected to increase in the future. Having an established and large customer base is important for the Company's sustainability.

The bargaining power of suppliers has low relevance in the case of Yahoo. The Company doesn't rely on suppliers since the service it offers is entirely produced in-house.

In the internet information providers industry, buyers typically have an incredibly high bargaining power. Given the wide selections of information providers, and the very low costs of shifting from one contents' page to the other, buyers have considerable power in deciding which page to visit. This "force" highly impact the Company's strategy; Yahoo continuously tries to generate new kind of contents, find new segments, and enter into expensive agreements, such as the one with Mozilla Firefox, to increase the number of visits on Yahoo Properties.

The last force affecting the industry and shaping the Company's strategy is the threat of substitute services. Social networks provide a cheap alternative for advertisers to promote their content. Social network have the potential to generate contents similar to those offered by the Company, increasing their share of visits at the expense of Yahoo (MarketLine, 2015). Although Yahoo has tried to enter the social networking segment with the acquisition of Tumblr, the expected results have not been reached, and the Company is far from competing with big players such as Facebook and Google. As the CEO recognized in 2014, the Company "did not have a mobile hardware, a mobile OS, a browser, or a social network" (Baer D., 2014). Acknowledged that competing without these resources was not possible, she tried to face the problem by establishing partnerships with stronger competitors.

Overall, this analysis highlights serious threats for the Company's sustainability. Social media as a substitute of contents' provider may seriously affect Yahoo sustainability in the long term making Yahoo's service obsolete.

6.1.3. SWOT analysis

In this section, to provide a complete overview of Yahoo strategy, the findings of both the PEST and Porter's Five Forces are summarized in the SWOT framework.

The SWOT framework classifies the factors affecting the firm's strategy into four categories: Strenghts, Weaknesses, Opportunities and Threats. The first two are related to the internal environment, while the last two are related to the external environment (Grant, R. M. 2010). According to Grant, the distinction between external and internal factors is extremely important for the correct analysis of the firm's strategy (Grant, R. M. 2010).

An effective strategy has to be consistent with both its external and internal environment such as the firm's goals, its resources, and its structure (Grant, R. M. 2010).

The Figure 2 shows the factors that affect Yahoo's strategy grouped under the SWOT categories.

Strengths	**Weaknesses**
• Growing user base • Inorganic growth strategy	• Limited presence in social media and networking segment • Ability to recruit
Opportunities	**Threats**
• Search deal with Microsoft • Positive trend in smart connected devices acceptance • Strong growth in mobile ad spend • Rising search queries	• Content portals are becoming irrelevant in the era of social networking • Stringent regulation • Foreign rate risk • Mobile growing importance

Figure 2. SWOT analysis. *Sources: MarketLine (2015), Yahoo annual report 2015*

As it can be seen by Figure 2, the SWOT analysis includes some points not discussed yet and that need further explanation. These points are briefly discussed below.

Opportunities

In 2015 the Company signed a five years deal with Microsoft according to which Microsoft exclusively provide paid search services to Yahoo and pays a percentage of Bing Ads revenue on Yahoo searches. This kind of agreement will probably benefit the Company in the long run (MarketLine, 2015).

The Company has historically recognized the revenues from display advertising as its largest revenue stream. While the whole segment doesn't show an exceptional growth, the mobile advertising space is gaining momentum and it is growing at an extraordinary rate. The Company will certainly benefit from the growth in the industry (MarketLine, 2015).

The yearly number of queries is growing as the number of people accessing the internet through multiple devices is increasing (MarketLine, 2015). The almost sure growth of the market, and the likely success of Yahoo initiatives to increase its market share will boost the revenues from search advertising.

Weaknesses

The weak performance, the announced reduction of the workforce, and the numerous rumors about the strategic options opened to Yahoo, negatively affect its ability to attract the best talents in the market and to retain the best employees. A loss in human capital is for sure detrimental for a firm since it can impact its ability to execute the business plan (Yahoo annual report, 2015).

Threats

The growing importance of mobile is one of those ambiguous item that could have been both on the opportunity side and the threat side. If it is true that a successful mobile strategy can generate tremendous opportunities for growth, it is also true that a complete failure in this segment could have a tremendous negative impact on the Company. Of course, this is something Yahoo should be aware of.

Overall, the SWOT analysis shows how the Company has to be able to capitalize on all the growth opportunities in order to overcome all the threats it is exposed to. Major mistakes in the future strategy may pose at risk its sustainability.

6.2. Performance analysis

The analysis of the performance is organized in three parts: stock analysis, financial statements analysis, key ratios analysis.

6.2.1. Stock analysis

During the last ten years, the Company's stock performance has been relatively week comparing to the market (the NASDAQ Composite Index[7] is used as benchmark for the analysis). As a first step the cumulative monthly returns of Yahoo's stock and that of the market have been compared. The results show that Yahoo's stock has constantly underperformed the market as it can be observed by the Chart 1 below.

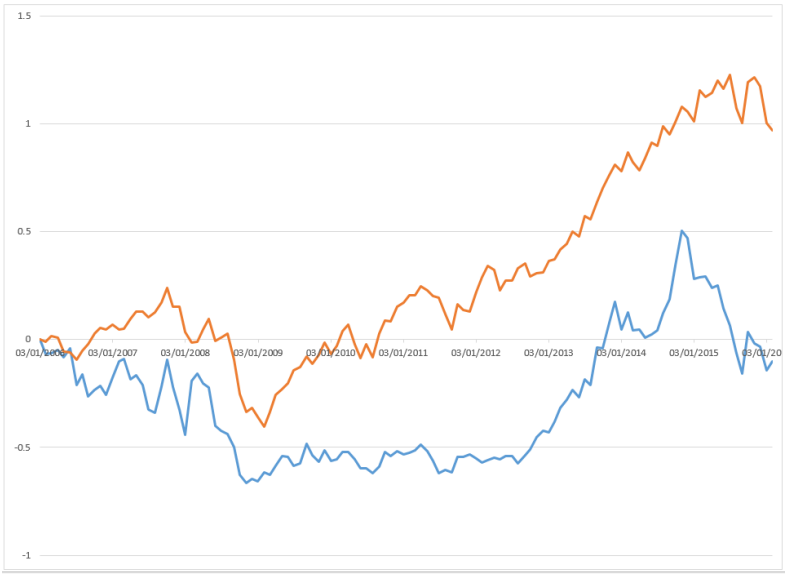


Chart 1. 10-years NASDAQ-Yahoo stock comparison. NASDAQ in red, Yahoo in blue. *Source: own construction*

However, by running the same analysis under a 5 year time frame ('11-'16) the situation looks quite different (Chart 2): Yahoo reverts the negative trend and outperforms the market starting in the fourth quarter of 2012. This may have been caused by the expectations on, Marissa Mayer who became CEO on September of that year. For the years 2013 and 2014, although the stock price had an outstanding performance, the main driver is identified in Alibaba's successful IPO in 2014 when

[7] The NASDAQ Composite Index (Symbol: COMP) includes all domestic and international based common type stocks listed on The NASDAQ Stock Market. The NASDAQ Composite Index is a broad based Index, and is a market capitalization weighted index. The value of the Index equals the aggregate value of the Index share weights, also known as the Index Shares, of each of the Index Securities multiplied by each such security's Last Sale Price, and divided by the divisor of the Index (Nasdaq, 2015).

the Company sold shares for $9.4 Billion in cash. This positive trend continued until the beginning of 2015 when the stock price started dropping steeply until the end of the year. The fact that the Company wasn't able to reach many of the announced quarterly targets was perceived very negatively from the market.

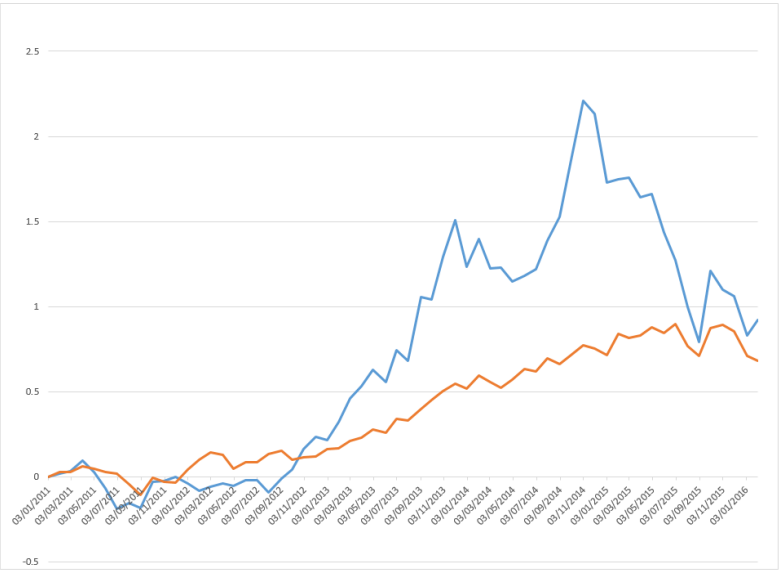


Chart 2. 5-years NASDAQ-Yahoo stock comparison. NASDAQ in red, Yahoo in blue. *Source: own construction*

The previous analysis offers an easy way to compare the Yahoo´s return with the market´s return.

In sum, the stock analysis highlights a very poor performance. Although the period 2012-2014 has been surprisingly good, the positive effect generated by the emphasis on the new CEO did not last long. The last year have been strongly disappointing. The company didn't accomplish its targets, and the hypothesis that Tumblr could have reached $100 Million revenues in 2015 (Fitzgerald B. R., 2014) revealed to be wrong. Since Tumblr's low revenues were not enough to justify the acquisition price of $1.1 Billion, the Company had to write off $230 Million from goodwill in FY 2015. Overall, in FY 2015 the Company wrote off a massive $4.5 Billion from goodwill (Yahoo annual report, 2015). This is recognized in the income statement as "charge for goodwill impairment".

6.2.2. Financial statements analysis

While in the previous paragraph the company's stock performance has been highlighted, here the attention is put on the data from the income statement (Exhibit 1), balance sheet (Exhibit 2), and cash flow statement (Exhibit 3). Then, in the next paragraph, the most relevant multiples and key

performance indicators (KPIs) of Yahoo are compared to those of its peers. The time frame chosen for the analysis is the 2011-2015, in a way to show the impact that Marissa Mayer had on the Company.

6.2.2.1. Income statement analysis

The analysis of *revenues* for the time frame put in light the Company's struggle in generating growth. Although Marissa Mayer created a mobile oriented strategy, this wasn't enough to revert the negative trend. As the numbers confirm, revenues in 2015 ($4.97 Billion) were almost the same of those in 2011 ($4.98 Billion) (Yahoo annual report, 2015). Revenues in 2011 dropped by 21% from 2010, and in the following years Revenues have slightly changed with ups and downs.

Total *operating expenses* have been stable in the period 2011-2014. The observed trend is closely related to that of revenues. As for revenues, in 2011 operating expenses dropped by approximately 25% over the previous year. For the following years, the value stayed at the 2011 level. In 2015, a goodwill impairment of $4.5 Billion (Yahoo annual report, 2015), together with a $600 Million increase in Traffic Acquisition Expenses (TAC), increased the value of total operating expenses by 117% over the previous year. TAC is a unique voice of expense typical of internet businesses, it is a key success factor for Companies as Yahoo (Marketrealist, 2015). Keeping this voice very low can have a terrific impact on margins. Yahoo's TAC decreased significantly in 2011, almost by 43%, and remained stable until the 2014.

The *earnings before interest and taxes* (*EBITDA***)** is a good measure for the company operating profit. Yahoo experienced a drop in 2014 of 76% over the FY 2013, recording a poor EBITDA of $143 Million (Yahoo annual report, 2014). In FY 2015, the Company registered a negative EBITDA of $4.7 Billion (Yahoo annual report, 2015). The goodwill impairment of $4.5 Billion and the increased TAC were the first cause for this stunning result. The EBITDA analysis confirms that, operationally, Yahoo didn't do well.

The *net income* in 2015 was negatively affected by the raise in costs shown above. Ultimately, Yahoo reported a loss of $4.4 Billion (Yahoo annual report, 2015). In the previous years, the net income had shown high variability, with jumps of +271% in 2012, -65% in 2013, +447% in 2014. The values of "other income" in 2012 and "restructuring charges", are responsible for this very unstable trend. For instance, the +447% in 2014 is explained by the $10.5 Billion gain on the sale of

Alibaba shares. Without this "extraordinary" income, the Company would have incurred a loss already in FY 2014.

Overall, the income statement analysis confirms the struggles of the Company in generating sustainable growth. Moreover, TAC increased and squeezed the already poor operating margin, and the fact that the net income value is largely affected by extraordinary gains/losses adds uncertainty among investors.

6.2.2.2. Balance sheet analysis

The dispose of *cash and marketable securities* have increased over the time frame, recording two big jumps in 2012 and in 2014: whether the cash level remained stable, the value in short term securities increased steeply. In 2012 the Company sold back to Alibaba Group 523 million common shares at $13.54 a share, while in 2014 it sold Alibaba ADs in the event of the IPO (Yahoo annual report, 2015). The proceeds from these two sales increased the level of cash in the Company. At December 2015, the company cash availability was approximately $4.2 Billion (Yahoo annual report, 2015), 21% less than in 2014, since it sold marketable securities for $2.3 Billion.

The value of Properties, Plants, and Equipment (*PP&E*), net of depreciation, has remained quite stable over the time frame, and recorded a +4.01%. Although the company is divesting its branches in Asia and EMEA, saving in lands and buildings, it is investing in software, improvements and new facilities in the US (Yahoo annual report, 2015).

The value of *goodwill* has dropped over the last year: the Company has recognized a goodwill impairment charge of $4.5 Billion (Yahoo annual report, 2015). The mix of reasons behind this value includes the low market capitalization of the Company over the last quarter of 2015, and the revised revenues' estimations for the next year. The largest part of the charge is due to a review of the carrying amount of the US & Canada operations, reduced by $3.7 Billion. Europe operations and Tumblr values have been reduced respectively by approximately $500 Million and $300 Million (Yahoo annual report, 2015).

The Company had no *debt* until the FY 2013, when it decided to issue convertible notes. A convertible note is a debt instrument that gives the holder the option to exchange them for shares in the company at a specified conversion price (Magennis, Watts, Wright, 1998). The value of convertible notes slightly increased over the FY 2014 and FY 2015. At December 2015, the value of convertible notes was $1.23 Billion, a very small number comparing to the total value of the equity

(Yahoo annual report, 2015). The "Convertible Senior Notes", due in 2018, can be converted into common stocks at a conversion price of approximately $53.43 per share (conversion rate of 18.7 shares per $1 principal amount on notes). The conversion price was 50% higher than the stock price the day of the emission, a very high premium (Yahoo annual report, 2014). The Company pays interests on convertible notes corresponding to an interest rate of 5.26%. According to Magennis, Watts, and Wright (1998) when the notes are set with a very high conversion price, these instruments are very similar to debt and can be treated accordingly since the probability of conversion at maturity is very low. On the other hand, if the conversion price is very low, convertible notes are very similar to equity since with a good degree of probability they will be converted in common shares at a convenient price (Magennis, 1998). In the case of Yahoo it can be concluded that the Notes are very similar to debt; at December 2015 Yahoo stock price was 33.26, well below the conversion price.

To sum up, the Company has a very low debt, and a good dispose of cash. The Company doesn't have any kind of liquidity problem, and the low amount of accounts receivables and payables have remained stable over the years. In the balance sheet no warnings are detected.

6.2.2.3. Cash flow statement analysis

Net *cash provided by operating activities* was -$282 Millions in 2012, $1.2 Billion in 2013, $896 Millions in 2014, and -$2.4 Billion in 2015 (Yahoo annual report, 2015). In 2015 the Company wasn't able to meet its operating needs as in 2013 and 2014 primarily because of the $3.3 Billion paid in taxes from the sale of Alibaba shares in the 2014 IPO (Yahoo annual report, 2015).

Net *cash provided by investing activities* was $3.4 Billion in 2012, -$23 Millions in 2013, $3.8 Billion in 2014, and $1.7 Billion in 2015. As anticipated above, the Company sold during the last year short term securities for $2.3 Billion (Yahoo annual report, 2015).

Net *cash used in financing activities* was $1.98 Billion in 2012, $1.75 Billion in 2013, $4 Billion in 2014, and $377 Million in 2015 (Yahoo annual report, 2015). In 2015 Yahoo paid $204 Million for stock repurchasing and $274 Million for tax payments (Yahoo annual report, 2015).

The income taxes paid on the ADs sale that happened in 2014 strongly affected the Company's cash flow statement. In general, the major events affecting the cash flow statement originated from the Company's connections with Alibaba Group and Yahoo Japan.

The 2015 performance was very disappointing for Yahoo. The negative EBITDA indicates that the business is suffering and that the slow revenues growth does not offset the costs' increase.

The Company has downward revised its estimation for future revenues, and has recognized that the carrying value of its Units has decreased over the FY 2014. Moreover, the cash flow statement's analysis demonstrated how important is the Company's investment in Alibaba. Because of the different scales, important events affecting Alibaba have even more important implications for Yahoo. Certainly, this is not perceived by the investors as a sign of stability.

6.2.2.4. Key performance indicators analysis

In this analysis, important financial indicators of Yahoo are compared to those of similar companies (Exhibit 4). According to Morningstar.com (2015), firms similar to Yahoo are: Alphabet Inc., Facebook Inc., Baidu Inc., Naspers Ltd, JD.com Inc., LinkedIn Corp, NetEase Inc., Twitter Inc., TripAdvisor Inc. In the remaining of the analysis, these firms will be recalled as the "peers".

Yahoo *Debt to Equity ratio (D/E)* of 4.2% is the lowest among the peers, which have an average leverage of 25.3%. As emerged in the balance sheet analysis, the Company's debt consists in only Convertible Notes.

Unlike its peers, which have an average *Beta* of 1.267, Yahoo has a Beta of 1.7. The company beta is a measure that indicates how movements in the company's stock are correlated with movements in the market (Morningstar, 2015). A value of Beta of 1.7 suggests that the market may consider Yahoo riskier than many of the firms in the comparable group.

The *Price-Earnings ratio (P/E)* of Yahoo is extremely higher than the peer's average: 112.6 for Yahoo, and 50.3 for the peers (Morningstar, 2015). This number suggests that the Company could either be overpriced, or have very poor earnings. The income statement seems to support the second reason.

Yahoo has a *Price-Sales ratio (P/S)* of 5.5, a bit less than the average of the comparable group (Morningstar, 2015). For instance, Alphabet Inc. has a P/S of 7.2, while Facebook Inc. recorded a P/S of 19.4. It appears that Yahoo might be slightly underpriced, since sales have remained stable over the last years.

As for the Price-Sales ratio, Yahoo's *Price-Book ratio* is less than the average of comparable firms. Yahoo has a Price-Book ratio of 1, while its peers record higher values (e.g. Alphabet Inc. (4.4), Facebook Inc. (7.4), Baidu Inc. (9.4), LinkedIn Corp. (5.8), TripAdvisor Inc. (7.3)) (Morningstar, 2015). A value of 1 indicates that Yahoo share price is equal its book value, suggesting that the Company might either be a bad investment or be underpriced.

Despite the fact that the Company has a very low D/E ratio, other indicators, such as the P/E ratio and the P/B ratio suggest that the market finds not easy to assess the value of the Company. While the very high P/E ratio is explained by the very low earnings, the reason for a P/B ratio of 1 is much harder to identify. At this point, the conclusion that the stock is underpriced it is only a suggestion.

To what concerns profitability ratios such as Profit Margin, Return on Assets, and Return on Equity, it is very hard to draw conclusions from their analysis. Indeed, the Company reported a negative income in 2015, while in 2014 it recorded a positive income that was biased by the extraordinary gain on investments. As a result, the comparison of the Company's profitability ratios with those of its peers adds low value to the analysis. A better measure to use for comparison is the Operating Margin (%), computed as the ratio between operating income and revenues. The Company had a negative Operating Margin in 2015 because of the large increase on its traffic acquisition costs and the goodwill impairment, and slightly positive margins in 2014 and 2013 of 3.1% and 12.6% respectively. The average of the peer group was 10.98% in 2015 and 21.93% in 2014, showing that Yahoo has strongly underperformed. However, if champions as Facebook and Alphabet were excluded from the peer group, the average value in 2015 would drop to 5.47%, highlighting the fact that in the last years similar companies have struggled to keep robust margins.

6.2.3. Summary of the findings

In sum, it emerges that Yahoo's performance has been very disappointing; except for the year 2014 when Alibaba drove the Company's stock price up, Yahoo's stock returns have underperformed the market. Operating margin and the net income for the FY 2015 were both negative, and the comparison with similar companies shows that Yahoo is perceived as a risky investment.

7. Model

7.1. Method

In order to prove that that the Hypothesis is true, the Company's value has to be found.

The valuation method chosen for the analysis is the Adjusted Present Value, integrated with the theory of the Probability based DCF. These theories are ultimately used to create an EXCEL-based model that computes the value of the Company.

Before explaining how the model was built, a brief overview of the theories and the software used for the analysis is given.

7.1.1. Adjusted Present Value

The main idea behind the APV is that the value of the firm is given by the sum of two components: the value of the company unlevered (all equity financed) and the value of the debt *tax shields* (Booth L., 2002). The problem the APV wants to solve is to take into account for the fact that during the company's life, its debt to equity ratio could change year over year. Indeed, when using the DCF approach, one single discount rate (the WACC) is used. The implicit assumption when using the Weighted Average Cost of Capital, is that in the perpetuity formula both the expected cash flows and the discount rate are constant (Booth L., 2002). In order for the WACC to stay constant, one of the two assumption has to be made: either the debt level is irrelevant (Modigliani-Miller argument) or the debt to equity ratio is constant over the years (Booth L., 2002). Therefore, if the debt level affects the WACC and it is expected to change, the WACC can't be used in the perpetuity formula (Booth L., 2002). In the case of Yahoo, the debt consists in Senior Convertible Notes that expire in 2018. After that year, the Company will probably hold no debt or will issue other notes or take a loan. This uncertainty makes very hard to assume one single debt level to use in the perpetuity formula.

Technically, the value of the Company as all equity financed is obtained by discounting the *Free Cash Flows (FCF)* at the *Rate of Return on Equity (K_u)* that would apply to the firm if it would have no debt (Fernandez P., 2015). The Free Cash Flow is a type of cash flow that considers the cash flow from operations after tax, ignoring the interest expenses on debt (Fernandez P., 2015).

Future FCFs have to be estimated for each period. First of all, the Net Income is computed by subtracting the taxes from the EBIT, in a way to ignore the interest expenses. Then, the depreciation has to be added to the Net Income because it is not a real cash outflow, but only an accounting practice

(Fernandez P., 2015). Lastly, the investment in fixed assets and the change in Net Working Capital, which are cash outflows not included in the EBIT calculation, have to be deducted to obtain the Free Cash Flow (Fernandez P., 2015).

K_u is known as "the unlevered rate of required return to assets" (Fernandez P., 2015). The value of the tax shields comes from the lower taxes the firm pays because it is financed with debt. In order to find the present value of this "tax benefit", the tax shields have to be found for each year. The value of the tax shield for year *n* is found by multiplying the interest expense in *n* by the tax rate. Once all the tax shields have been obtained, they have to be discounted back to the present at the market cost of debt (Fernandez P., 2015). The cost of debt (K_d) does not have necessary be equal to the interest rate the company pays on its debt when contracted (Fernandez P., 2015). The APV idea is described by the following equation:

$$V = E + D = NPV(FCF; K_u) + NPV(Tax\ Shields; K_d)$$

Equation 3. APV approach. *Source: Fernandez P., 2015*

where E is the value of the company as if all equity financed and D is the Present Value of the tax shields. More in detail, Equation 3 can be re-written as:

$$V_L = V_U + PVTS = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+K_u)^t} + \sum_{t=1}^{\infty} \frac{T_c K_d D_{t-1}}{(1+K_d)^t}$$

Equation 4. APV approach (1). *Source: Ross S., Westerfield R., Jordan B., 2008*

where FCF_t is the unlevered Free cash flow at time t, T_c is the corporate tax rate, and D_{t-1} is the debt balance remaining at the end of the year $t-1$. $T_c K_d D_{t-1}$ is therefore the tax shield for year *t*, and it is discounted at the cost of debt under the assumption that the tax shield has the same risk of the debt generating it. Considered that is impractical, and presumably impossible to estimate the value of each cash flow from year 1 to infinity, the part of the equation representing V_U is usually decomposed in two terms: the Present Value of the Free Cash Flow during the explicit forecasted period, and the present of the Free Cash Flow after the explicit forecasted period. The Equation 4 can be further decomposed as:

$$V_L = V_U + PVTS = \sum_{t=1}^{n} \frac{FCF_t}{(1+K_u)^t} + FCF_n \frac{(1+g)}{(K_u - g)(1+K_u)^n} + \sum_{t=1}^{\infty} \frac{T_c K_d D_{t-1}}{(1+K_d)^t}$$

Equation 5. APV approach (2). *Source: own construction*

where n indicates the explicit forecasted period.

The second term in the equation represents the present value of the "terminal value" of the Company. Its calculation relies on the principle of the growing perpetuity (Brealey R., Myers S., Allen F., & Mohanty P., 2012), which very practically solves the problem of estimating the present value of an infinite stream of cash flows that grows at a constant rate. The growing perpetuity equation is the following:

$$PV_n = \frac{C_{n+1}}{(r-g)}$$

Equation 6. Present value of a growing perpetuity. *Source: Brealey R., 2012*

Where C_{n+1} is the cash flow in $n+1$, r is the discount rate, and g is the long term growth rate. This equation determines that the present value of a stream of cash flows starting in year n is given by the free cash flow in year $n+1$, divided by the difference between the discount rate and the growth rate (Brealey R., 2012).

In line with the theory of the Probability DCF introduced above in this work, the following paragraph introduces the software that it is used to take inputs' probabilities into account.

7.1.2. @RISK

In order to incorporate the theory of the Probability Based DCF in the model, the software Palisade @RISK is used. In simple terms, integrating @RISK add-in in the EXCEL model allows the user to use ranges of values as inputs in place of point values. Consequently, the final output will not be a single value but a range of values distributed according to a probability curve. The discussion below provides a detailed explanation of how @RISK operates.

@RISK performs risk or sensitivity analysis using Monte Carlo simulations to show many possible results of the model built on Excel and how likely they are to occur (Palisade.com, 2015). This type of analysis is extremely useful in situations with high uncertainty when considering only one scenario could be hazardous. Monte Carlo simulation gives the possibility to input in the model ranges of values of those variables that have high uncertainty (Palisade.com, 2015). Once input the ranges of values and specified the probability distributions, the simulation computes the result of the model over and over, every time using different values from the specified ranges. @RISK gives the

possibility to run the model even 50,000 times. The final outcome of the Monte Carlo simulation is a distribution of the possible outcomes. To better describe the uncertainty embedded in the variables, @RISK lets the user to select the distribution that better fits the problem. The selection of the probability distribution is an opportunity to generate results that better describe the reality of the problem (Albright S., Winston, W., & Zappe, C., 2010).

Generally speaking, simulations are based on the production of originally independent random variables that are distributed according to a certain distribution (Robert, C., & Casella, G., 2013). Therefore, to allow @RISK to simulate many different scenarios, at least one of the input cells has to contain a random variable (Albright S., 2010). What is needed is a *uniform pseudo-random number generator* (Robert, C., 2013), which is an algorithm that, beginning from an initial value u_0 and a transformation *D*, produces a sequence $(u_i) = (D^i(u_0))$ of values in (0, 1). For all *n* the values of *u* reproduce "the behavior of an independent and identically distributed sample of uniform random variable when compared through a usual set of tests" (Robert, C., 2013).

Fortunately, Excel has already a function that works as a uniform random number generator:

$$= RAND()$$

Formula 1. Random formula. *Source: Supportoffice.com, 2015*

This formula generates a different number greater or equal 0 and less than 1 every time the user presses "F9" (recalc key) (Supportoffice.com , 2015). It is important to note that this function assigns to each value between 0 and 1 the same probability to be drawn, and that the number of possible values *N* within the range (0; 1) is infinite. This consideration allows to conclude that the numbers generated by the "Random Formula" are defined by a probability distribution called "Uniform distribution".

According to Mukhopadhyay (2000), a continuous random variable *X* has the uniform distribution on the interval (a, b), denoted by $Uniform(a, b)$, if and only if its probability density function is given by:

$$f(x) = (b - a)^{-1} \; for \; a < x < b,$$

Function 1. Uniform probability density function. *Source: Mukhopadhyay, N., 2000*

where $-\infty < a, b < +\infty$.

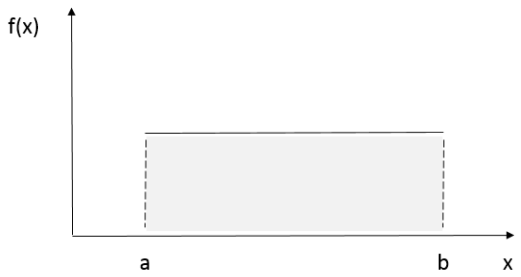


Chart 3. Uniform probability density function. *Source: own construction*

Random numbers are the starting point to generate scenarios and build a spreadsheet model that works with @RISK.

The motivation behind the use of @RISK in the case of Yahoo's valuation is that the Monte Carlo simulation carries many advantages over the "single-point estimate". First of all, the probability distribution is a type of outcome that specifies not only the results, but also the probability with which they can occur. Secondly, the Monte Carlo simulation enables a better visualization of the results, and it makes easier to identify the variables with higher influence on the final result. As a third point, the single-point model makes very difficult to combine different inputs, and consequently to create different scenarios that can be valuable to make further analysis (Palisade.com, 2015).

Below, the last theory relevant to the model is presented.

7.1.3. Trinomial tree

In the part "forecast" of this analysis, the simulation model used to forecast revenues builds on the theory of the "trinomial tree", which here is introduced briefly.

The trinomial tree approach derives from the methodology of the "*binomial tree*", very common in the field of derivative valuations. Here, a very brief explanation of how the binomial tree works is given. The binomial tree approach recreates a random path of an asset as a series of up and down movements that are proportional to the volatility of the asset (Mastro M., 2013).

The volatility of the asset in reality varies with time, and this effect can be included in the tree (Mastro M., 2013). The structure of the binomial tree is such that from one period to the other the asset price can move only in two direction, up (u), and down (d). The probability of an up movement is p, while the probability of a down movement is $1 - p$. In the case of the valuation of a financial derivative, the expected value of the tree is found as:

$$E(S_{t+dt}) = S_0 e^{rdt} = pS_0 u + (1-p)S_0 d$$

Equation 7. Expected value of the binomial tree. *Source: Mastro M., 2013*

Where S is the stock price, dt is the time step, e^{rdt} is the expected value of the log-normal distribution and the growth factor for the stock, and r is the risk free rate. The p is found as follows:

$$p = \frac{e^{rdt} - d}{u - d}$$

Equation 8. Probability of an up movement. *Source: Mastro M., 2013*

The values of u and d are given by the equations:

$$u = e^{\sigma\sqrt{dt}}$$

$$d = e^{-\sigma\sqrt{dt}} = \frac{1}{u}$$

Equation 9 & 10. Values of the up and down movements. *Source: Mastro M., 2013*

It emerges that the size of the movements is defined by the stock volatility (Mastro M., 2013). Once these parameters have been estimated, the tree is built by multiplying the value of the stock in year t-1 for the size of the up or down movement to find the value of the stock in year t, and so on. Figure 3 below shows the physiognomy of a hypothetical binomial tree.

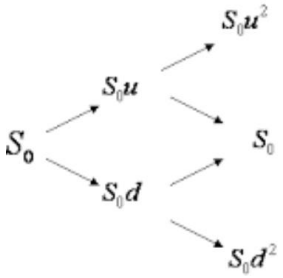


Figure 3. Binomial tree. *Source: own construction*

The *trinomial tree* extends the binomial tree model by increasing the flexibility of the asset; it adds a third movement m, which indicates that the price stays constant over a time step dt with probability p_m. At any node of the tree, the stock price can reach one of the three different nodes at its next step (Mastro M., 2013).

The new probabilities for the up and down movements, and for the m can be estimated as follow:

$$p_u = \frac{1}{6} + \frac{1}{2}[M_j + (M_j)^2]$$

$$p_m = \frac{2}{3} - (M_j)^2$$

$$p_d = \frac{1}{6} + \frac{1}{2}[-M_j + (M_j)^2]$$

Equation 11, 12, &13. Probability of the movements in the trinomial tree. *Source: Mastro M., 2013*

M_j is the expected value of the node computed as:

$$E[dX] = M(j\delta x) = (\delta x) + 0 * p_m - (\delta x)p_d = \delta x(p_u - p_d)$$

Equation 14. Expected value of the node in a trinomial tree. *Source: Mastro M., 2013*

The equations of the movements' probabilities are derived from the expected value equation after making some considerations. δx in the equation is the adjusted variance computed as δx=$\sigma\sqrt{3\delta t}$ in order to match the kurtosis of the normal distribution (Mastro M., 2013). This selection of the variance makes $p_u = p_d = \frac{1}{6}$, and $p_m = \frac{2}{3}$.

In the case of Yahoo, the knowledge of the trinomial tree is applied, with some adaptations, to the forecast of the revenues from search advertising. More detail is given in the next section.

7.2. Forecast

According to Beccalli & Frantz (2011), forecasting requires the practitioner to take a forward looking perspective, and ask himself how the future earnings and growth for the firm in object will change in the future.

The literature identifies two types of forecasting, simple and full-information forecasting, which differ because of the data set they use. While simple forecasting relies only on the information contained in the firm's financial statements, full-information forecasting uses external sources besides the firm's internal sources (Beccalli & Frantz, 2011). In this work, the full-information approach is used since the data set used goes beyond the financial statements of the Company.

7.2.1. Revenues Forecast

As anticipated in the core business description above in this work, the Company has three main revenue streams: "search advertising", "display advertising", "other".

Revenues from "search advertising" are those revenues generated when users click on sponsored search results which link to advertisers' websites. For every "Click", the Company collects a fee (Yahoo annual report, 2014). Revenues recognized as display advertising include fees that the advertisers pay to purchase the space for their graphical or non-graphical commercials (Yahoo annual report, 2014). Other revenues indicate all the revenues collected on Yahoo Properties, and the royalties from Alibaba and Yahoo Japan.

Revenues generated from display and search advertising are forecasted using a simulation, while "other" revenues have been forecasted in base of the results of the other two revenue streams. Indeed, it is very hard to run a realistic simulation to estimate the future value of other revenues since they consist in an aggregation of different revenue components, unrelated among each other, and of which few details are given by the Company. However, this lack of detail have a limited impact since "search advertising" and display advertising" combined have driven about 80% of the revenues in the period 2009-2015, and presumably they will continue to represent an even larger percentage in 2016 and beyond when the Company will execute the spin-off and refocus its business.

The methodologies used to forecast the three revenue streams are specified in the following paragraphs.

7.2.1.1. Search advertising forecast

The forecasted period can be divided in three stages: 2016-2019 ("First stage"); 2020-2023 ("Second stage"); beyond the year 2023 ("Perpetuity"). Search advertising, which represented approximately 42% of Yahoo's total revenues in 2015 (Yahoo annual report, 2015), for the first time in the Company's history was the largest revenue stream.

7.2.1.1.1. First stage

The main idea behind the revenues forecast as executed in this analysis, is that the revenues of the Company could be estimated by using two parameters: the size of the market in which the Company competes, and its penetration rate in that market. The multiplication of these two parameters theoretically reproduces the Company's revenues for a specific year. Equation 15 shows this crucial idea which is at the base of the whole valuation:

$$Revenues_t = Penetration\ rate\ _t * Market\ size_t$$

Equation 15. Hypothetical revenues. *Source: own construction*

The reason behind this peculiar way to forecast revenues is the will to find a more accurate methodology to estimate growth rates that fully exploits available market data and estimates. Usually, practitioners forecast revenues by assigning growth rates based on historical data of firm's revenues. Alternatively, Equation 15 says that a firm's revenue is a function of two parameters, and by making specific assumptions on each of them it is possible to correctly forecast revenues.

First of all, data about the size of the search advertising market in the United States (US) and worldwide are collected for each of the years from 2016 to 2019. Statista.com (2015) is used as the source of data. The First Stage is limited to three years because the market is "new", and its growth rates are very hard to predict.

In 2015, the Company generated approximately $3.9 Billion in revenues in US, which is a very high number if compared with the $344 Million generated in EMEA, and the $648 Million in Asia (Yahoo annual report, 2015). Moreover, while both the revenues from EMEA and Asia dropped over the previous year, revenues in US recorded a 13% increase.

In the US, the value of total search advertising spending, which can be considered as a proxy for the size of the market, appears as in Chart 3.

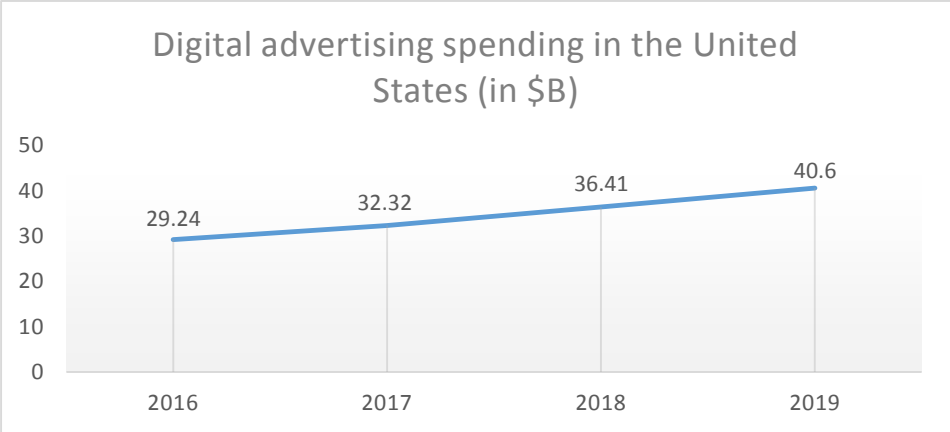


Chart 4. Forecast of total digital advertising spending in US. *Source: Statista, 2015*

As it can be observed, the market in US is expected to grow at a pretty high pace: 10.21% in 2016, 10.53% in 2017, 12.65% in 2018, and 11.51% in 2019 (Statista, 2015).

Chart 5 below shows the evolution of the size of the worldwide market.

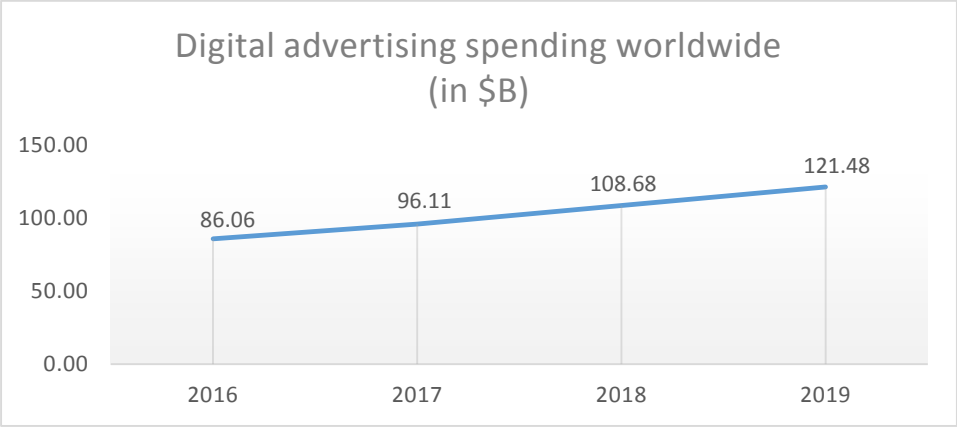


Chart 5. Forecast of total digital advertising spending worldwide. *Source: Statista, 2015*

As it can be observed, the situation is very similar to that of the US, with growth rates of 10.57% in 2016, 11.69% in 2017, 13.08% in 2018, and 11.78% in 2019 (Statista, 2015).

The second source of data to be collected is the *historical penetration rate* of Yahoo in the search advertising market.

In the US, Yahoo had the 12.73% market share as at December 31st, 2015. This number has been constantly declining since the year 2008, when the Company had 21% of the local market, until the year 2014 when it reached its lowest: 10.18%. The Company's ability to slightly increase its market share in 2015 might be attributed to its partnership with Mozilla Firefox.

At December 2015, Yahoo had the 3.61% of the search advertising market worldwide. This number has been dropping since 2008, when the Company had approximately 4% market share, until the year 2013 when it reached the lowest: 3%.

The sources of data are segmented according to two criteria: the *geography*, and the *device* used to access Yahoo Properties. This segmentation is important for two reasons: (i) Yahoo generates approximately 70% of its revenues in the US, where its market share is largely different from that in the rest of the word, (ii) the revenues from mobile platforms are growing at an extraordinary rate, and the Company has invested many resources in the mobile segment.

Revenues from mobile for the year 2015 were $1,048 Million (Yahoo annual report, 2015), with 785 million monthly users. This is a significant number if considered that Yahoo total monthly visitors from all platforms were around 1 billion in 2014. The number of mobile users in 2015 was more than three times that of four years ago, and the positive trend is expected to last in the near future as more users will be able to access Yahoo Sites and Affiliates through their mobile phones (Yahoo annual report, 2015).

As it can be observed in Chart 6, the *mobile advertising spending* is growing at a very fast pace in the US, representing a clear opportunity for the Company.

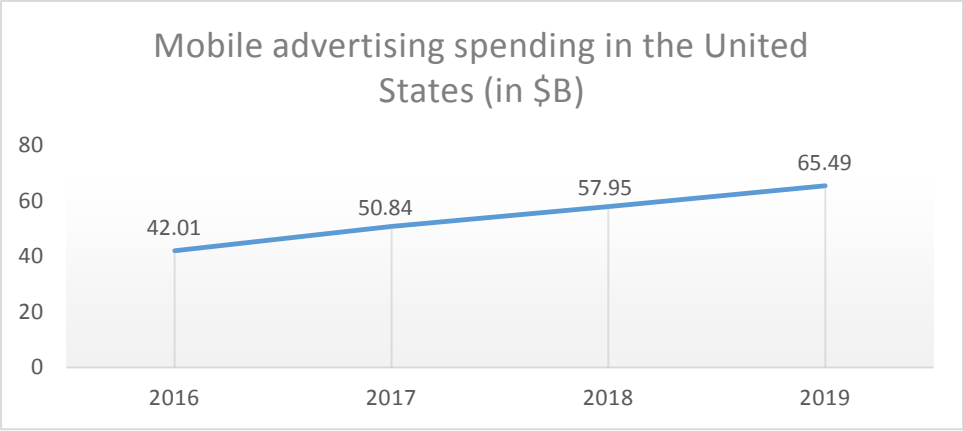


Chart 6. Forecast of total mobile advertising spending in US. *Source: Statista, 2015*

A similar scenario is expected worldwide (Statista, 2015).

By using the data about the future size of the market and the penetration rate of the Company, a simulation model to forecast revenues is built. It estimates revenues in year *n* by multiplying the market size in year *n* for the penetration rate in year *n*. While the market size is given by Statista.com, the penetration rate is estimated in base of the historical data collected. The penetration rate can

increase, decrease, or stay constant over the year. This simplification is built on the theory of the trinomial tree.

Below, a detailed explanation of how the simulation model works is given.

Starting from the FY 2015, the hypothetical Yahoo's revenues from search advertising are found by multiplying the size of the market and the penetration rate in 2015. This operation is made for both the US and the worldwide market.

Note that the data for the worldwide market have been modified to pull out the value of the US market, in a way to avoid to include the value of the US market twice. For instance, for the year 2014, the Company's penetration rate worldwide is 3.61% (Statista, 2015). After pulling out the share of the US market, this value drops to 0.13%. This is the Company's penetration rate outside the US.

In order to forecast revenues, the growth of the penetration rate has to be found first. The parameters required to estimate the penetration rate are those introduced in the trinomial tree theory.

The stock price (S) from the trinomial tree theory is substituted by the *penetration rate*, whose walk is defined by each of the three possible movements (u, d, m). The time step is e^{rdt} is equal to one year, and the size of the movements is defined by the volatility, that is computed as the historical standard deviation of the Company's penetration rate, using the data for the years 2012-2015. The standard deviation for the penetration rate in the US is equal to 1.348%, while that in the worldwide market is 0.3644%. The probability of the movements, computed as from the equations 11, 12, 13 are very close to those anticipated by the theory.

For the penetration rate in US, the probabilities, computed using equations 11, 12, and 13, are:

$$p_u = 0{,}166588009 \approx \frac{1}{6}$$

$$p_m = 0{,}666666642 \approx \frac{2}{3}$$

$$p_d = 0{,}166745349 \approx \frac{1}{6}$$

For the penetration rate in the worldwide market, the probabilities computed through equations 11, 12, and 13 are:

$$p_u = 0{,}166660916 \approx \frac{1}{6}$$

$$p_m = 0{,}666666667 \approx \frac{2}{3}$$

$$p_d = 0{,}166672417 \approx \frac{1}{6}$$

The size of the movement u and d is directly correlated to the standard deviation σ, that each year is adjusted for the data of the penetration rate of the previous year. This means that the size of the movement it is not constant through the forecasted period, but changes according to the value of the penetration rate in the previous years.

The model (Exhibit 5) simulates, according to the assigned probabilities, the penetration rate in year $t + 1$ and beyond by using the formula $= RAND()$ in EXCEL. The outcome of the formula $= RAND()$ provides the input to the move of the penetration rate. Figure 4 shows a part of the model.

		2015	2016	2017	2018	2019
New(stdev)	US		2.4100%	2.2719%	2.1708%	2.0674%
New(stdev)	WW		1.2157%	1.4649%	1.5744%	1.6212%
Rand()			*0.981910448*	*0.544415863*	*0.26542427*	*0.057792855*
u			1.024392299	1.022978789	1.021945556	1.020889347
d			0.976188518	0.977537375	0.978525709	0.979538089
US		**12.000%**	**12.000%**	**12.000%**	**11.730%**	**11.988%**
u			1.012231537	1.014756612	1.01586897	1.016344392
d			0.987916266	0.985457979	0.98437892	0.983918451
WW		**0.40%**	**0.40%**	**0.40%**	**0.39%**	**0.40%**

Figure 4. Result of one Trinomial tree in Excel. *Source: own construction.*

The values shown in Figure 4 are those which correspond to one among the many possible scenarios. The Random numbers are generated in the line *Rand()* in the Figure 4. The random number gives the input to the $= IF$ formula which selects the movement as from Formula 2,

$$= IF(Xi < {}^{1}/_{6}; PenRate(t-1)$$
$$* u; IF(AND\left(Xi >= {}^{1}/_{6}; Xi < {}^{5}/_{6}\right); PenRate(t-1); PenRate(t-1) * d))$$

Formula 2. IF formula used in the trinomial tree. *Source: own construction*

where X_i is the random number between 0 and 1 generated in year t, $PenRate(t-1)$ is the penetration rate in $t-1$, d is the size of the downward movement, and u is the size of the upward movement. Note that, fully consistent with the trinomial tree theory, the size of the movements change year over year together with changes in the adjusted standard deviation: the standard deviation in year $t+1$ is modified according to the value of the penetration rate obtained in year t, the standard deviation in year $t+2$ modifies according to the value of the penetration rate in year $t+1$, and so on.

Formula 2 says that if the value of Xi is lower than $^1/_6$ (p_u), then the outcome has to be the product of the value of the penetration rate in the previous year and the value of u. If X_i is grater or equal to $^1/_6$, but lower than $^5/_6$ (note that $^5/_6$-$^1/_6 = {}^2/_3$=p_m), then the outcome has to be equal to the unmodified value of the penetration rate in the previous year. Ultimately, if the value of X_i is greater than $^5/_6$ (Note that 1-$^5/_6$=$^1/_6$=p_d), the formula gives an outcome equal to product between the value of the penetration rate in the previous year and the value of d (d is a decimal between 0 and 1).

It is important to observe in Figure 4 that four different random numbers, one for each forecasted year, are generated by a different and independent Random formula. Without the repetition of the Random formula in each year, the random number generated in year t would give the same command to all the following years ($t+1, t+2, ..$), and a steady scenario would be observed. For instance, if the random number generated the input for a d movement in 2016, then in 2017 and beyond a d movement would be observed since they all refer to the same random number. In reality, in the case of a mature firm, the penetration rate is more likely to move in different directions from year to year.

The forecasted penetration rates (Figure 4) are then multiplied for the market sizes of their respective years to create the "simulated revenues" ("Revenues" in Figure 5).

	2016		**2017**	
	US	WW	US	WW
Revenues	=PenRate*MarketSize	=PenRate*MarketSize	=PenRate*MarketSize	= PenRate*MarketSize
Estimated g	=(Rev'16-Rev'15)/Rev'15	=(Rev'16-Rev'15)/Rev'15	=(Rev'17-Rev'16)/Rev'16	=(Rev'17-Rev'16)/Rev'16

Figure 5. Excel formulas used for the "hypothetical revenues" estimation. *Source: own construction*

The yearly growth rates ("*estimated g*" in Figure 5) of the simulated revenues are computed as:

$$Estimated\ g = {(Simulated\ \ Revenues_{t+1} - Simulated\ \ Revenues_t)}/{Simulated\ \ Revenues_t}$$

Equation 16. 1-year growth rate computation. *Source: own construction*

The estimated growth rates are ultimately used to forecast the revenues of the Company.

A similar analysis is conducted to estimate the growth rates of the revenues from mobile (Exhibit 6). According to the annual report (2015), revenues from mobile were approximately $1 Billion at December 2015. Revenues from mobile can be thought as the product of two variables: the "number of users", and the Revenue per User ("RpU"). The RpU for Yahoo in the year 2015 was 1.34, computed as the ratio of total revenues and number of users. To correctly estimate the revenues from mobile, both these two parameters have to be forecasted.

The number of users from mobile grew by 60% in 2013, 44% in 2014, and 36.5% in 2015 (annual report, 2015). To forecast the number of users, the growth of the *mobile advertising spending* (Statista, 2015) is used as a proxy. Three scenarios are created:

1. At market rate
2. Slow
3. Fast.

In the first scenario, the number of users grows at a rate similar to that of the mobile advertising spending. In the second scenario, the number of users grows at a rate slower than that of the mobile advertising spending. In the third scenario, the number of mobile users grows at pace faster than that of the mobile advertising spending. The three scenarios are assigned the same probability to occur.

For what concerns the RpU, this parameter is expected to increase by no more than 0.2% a year, a minimum variation that marginally affects the whole valuation, but that the model takes into account.

Lastly, revenues are estimated as the product of the RpU and the number of users. The growth rates are then computed and used for forecasting.

7.2.1.1.2. Second stage

The *second stage* of growth has been added with the logic to reconcile the difference between the first stage growth and the long term growth assumed in the perpetuity formula.

This stage does not involve simulations, and it bases fully on the results of the first stage growth. The model assumes that the revenues' growth rate between the 2018 and the 2019 slows down smoothly between the years 2019 and 2023. The assumed yearly decrease is 10%.

7.2.1.1.3. Third stage

The *third stage*, or "perpetuity", consists in choosing the appropriate growth rate at which the Free Cash Flow will grow beyond the year 2023.

According to Damodaran (2015), since the long term risk-free rate will converge on the long term growth rate of the economy, the stable growth rate should not exceed the value of the risk free rate used in the valuation (Damodaran A., 2015). A violation of this "rule of thumb" would imply that the Company will grow at a rate faster than the economy. Certainly, this would be quite hard to justify in the case of Yahoo. The stable growth rate could also be negative, since computing the terminal value would still be possible: the intuition behind is that the firm liquidates itself year by year until its value goes to zero (Damodaran A., 2015).

Keeping in consideration those two guidelines, a bottom and a top value for the growth rate are chosen: -1%, and +5%. The model does not choses arbitrary only one number between the two values, but considers the whole range as the input. This is possible in Excel by modeling the formula

$$= RANDBETWEEN(bottom;\ top).$$

Formula 3. Randombetween formula. *Source: supportoffice.com, 2015*

Formula 3 requires to specify two arguments, the bottom and the top value of the range, and it returns a random integer within the range every time the user "recalcs" the page (supportoffice.com, 2015). In this case, the bottom value chosen is -100, while the top is 500. The result is then divided by 10,000 to obtain a value in the order of the cents.

Contrary to the "Random" formula, the "Randombetween" is not able to generate real numbers, but only values in the form of integer. This means that the stable growth rate can assume one among the six hundred and one possible values.

It is very important to note that, differently from the "Random" formula, "Randombetween" creates numbers that follow the pattern of a "discrete" Uniform distribution. Indeed, the formula randomly picks one from the finite number of integers specified by the range.

The situation can be best described with a simple example: one ball drawn from the urn containing *N* balls (Cicchitelli G., 2001). In this case, the resulting random variable has the number of "balls" *N* as its determination, and the probability assigned to each value of *N* is equal to *1/N*. It can be concluded that a random variable has a discrete uniform distribution in the integers 1,2,..*N*, if its probability function is expressed as (Cicchitelli G., 2001):

$$f(x) = \frac{1}{N}, \qquad x = 1,2, \dots, N.$$

Function 2. Probability function of a uniform discrete distribution. *Source: Cicchitelli G., 2001*

The average $(E(X))$ and the variance $(Var(X))$ of the discrete Uniform distribution are expressed respectively by the following formulas (Cicchitelli G., 2001):

$$E(X) = \frac{N+1}{2}$$

Equation 17. Expected value of a discrete uniform distribution. *Source: Cicchitelli G., 2001*

$$Var(X) = \frac{N^2 - 1}{12}$$

Equation 18. Variance of a discrete uniform distribution. *Source: Cicchitelli G., 2001*

Note that the third stage of forecast is equal for all the revenues streams, therefore its analysis is not repeated in the remaining of the work.

7.2.1.2. Display advertising

The forecast of revenues from display advertising is divided in two stages. Indeed, the first and second stages of the previous analysis are here combined in a single stage that comprises the period 2016-2023. The reason behind is that in this case the data of both the market size and the future penetration rate of the Company are provided by Statista.com (2015), and no simulation is needed.

The analysis has started with the collection of data on the size of the market and the Company's penetration rate. The market forecast appears as in the Chart 7.

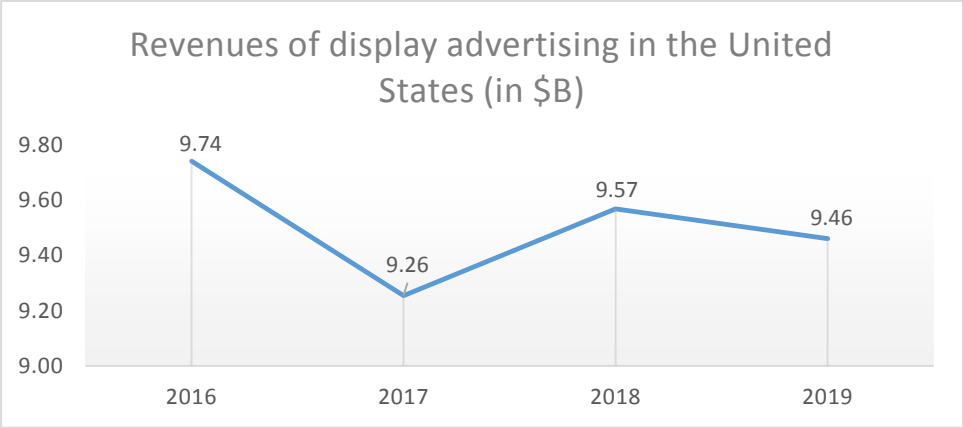


Chart 7. Total revenues of display advertising in US. *Source: Statista, 2015*

Data suggest that for the years 2016-2019 this market has an unclear path, since revenues in US are expected to increase by 6% in 2016, decrease by approximately 5% in 2017, increase by 3.4% in 2018, and decrease by 1.13% in 2019 (Statista, 2015). Since no data are available for the years 2020-2023, the assumption is that the size of the market will keep growing at the average growth rate of the years 2016-2019.

Statista.com provides data about the Company's share of the US total digital display advertising revenues for the years 2013-2017. Looking at these data it emerges that Yahoo had a share of 7.2% of this market in 2015, and that the trend was declining. The company lost 24% of its market share in 2014, 16% in 2015, and it is expected to lose 15% in 2016 and 10% in 2017 (Statista, 2015). Given the fact that data are not available for the years 2018-2023, the assumption is that the Company's market share will continue to drop in the future at the 2017 rate of 10% (Chart 8).

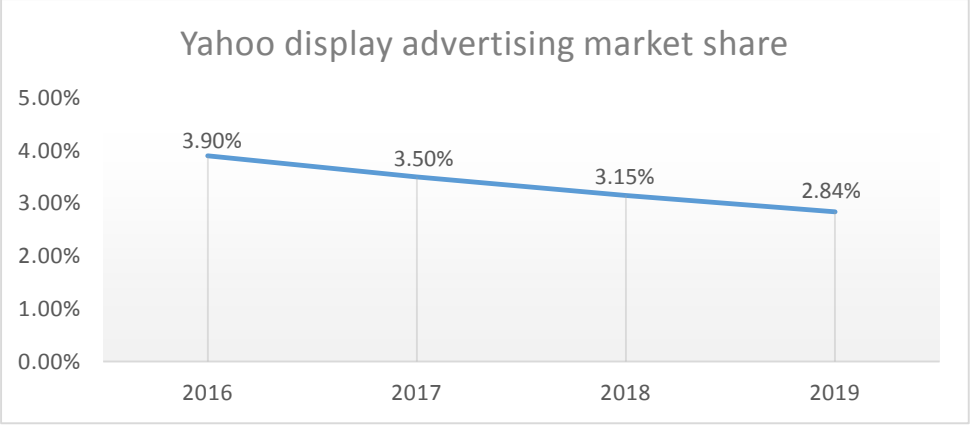


Chart 8. Yahoo's penetration rate in the worldwide display advertising market. *Source: Statista, 2015*

Once the data are collected and estimated for the time frame 2012-2022, "hypothetical" revenues are computed as the product of the market size and the Company's penetration rate. Then, the growth rates for each year are computed on the estimated "hypothetical" revenues. According to this estimate the Company's revenues from display advertising will decrease by 10% in 2016, 14.75% in 2017, 7% in 2016, 11% in 2019, 5% in 2020, 8.5% in 2021, 9.3% in 2022, and 8% in 2023.

Before concluding this analysis, it is important to consider that part of the display advertising revenues that the Company recorded in 2015 came from mobile platforms. Of the $2.07 Billion revenues that the Company recognized as coming from display advertising, $426 Million were generated on mobile platforms (eMarketer, 2015). If considered that this number is approximately twice as large of that of the previous year ($190 Million in 2014), the result is even more surprising. According to eMarketer (2015), the Company's display advertising revenues from mobile will grow to $750 Million (+75% over the 2015) in 2016, and $990 Million in 2017 (+30% over the 2016). For the completeness of the analysis, it is important to segment display advertising revenues in base of the platform generating them. Therefore, in simple words, the model takes into account that display advertising revenues from mobile grow at a fast pace.

Display advertising revenues from mobile for the years 2018-2023 are forecasted by assuming that the growth rate for the year 2017 will decrease at a pace of 5% yearly.

Once the display advertising revenues are segmented, it is possible to combine the results to observe the combined growth rates for the time frame. While revenues from non-mobile platforms, $1.6 Billion in 2015, are expected to decrease year over year to reach a value of $755 Million in 2023, revenues from mobile, $426 Million in 2015, are expected to grow to $3.3 Billion in 2023. The model expects that in 2018 the mobile platform will generate more revenues that the non-mobile.

Differently from the search advertising analysis, in this case it is possible to list the results of the forecast since no simulation is involved and the model considers only one scenario. Therefore, the expected growth rates are 8% in 2016, 1% in 2017, 7% in 2018 and 2019, 11% in 2020 and 2021, 12% in 2022, and 11% in 2023.

7.2.1.3. Other revenues

Revenues from other sources are forecasted as a fixed percentage of total revenues. The Company recognizes as "other" those revenues generated by listing-based services, transactions, royalties, patent licenses, and fees (Yahoo annual report, 2015). Other revenues were 16.2% of the

total revenues in 2015, while in the 2014 and 2013 were respectively the 20% and the 21%. The drop in 2015 is explained by the fact that the Company didn't recognize royalties from the Alibaba IPO (Yahoo annual report, 2015).

Since this work assesses the value of the Company in case of spin-off from Alibaba, it is likely that "other revenues" in the future will represent a percentage of total revenues more similar to that of the 2015 than to that of 2014 or 2013. As a result, the model assumes that other revenues will represent the 16% in 2016, the year of the spin-off execution, 13% in the first stage (2017-2019), and 10% in the second stage (2020-2023).

7.2.2. Costs forecast

As from the Company's Income Statement, the voices of cost are: *Cost of revenue (Traffic acquisition costs), Cost of Revenue (Other), Sales & marketing, Product development, General and administrative, Gains on sales of patents, Goodwill impairment charge, Restructuring charges, Intangibles impairment charge* (Yahoo annual report, 2015).

Cost of revenue include traffic acquisition costs ("TAC"), which means those fees that the Company pays to third parties which have Yahoo's advertising offerings integrated on their websites (2015). In 2013 and 2014, this voice was respectively 6% and 5% of total costs, while in 2015 it was the 18%. This is primarily due to the Mozilla Firefox agreement that costed the Company $375 Million in the 2015 (Yahoo annual report, 2015).

Other cost of revenue includes stock-based compensation, other expenses associated with the utilization of Yahoo Properties, and amortization and depreciation expenses. These expenses accounted for the 24% of total revenues in 2015, 25% in 2014, and 23% in 2013. For the purpose of the analysis, depreciation expenses are extracted from this voice, and considered by themselves. *Depreciation* expenses were $629 Million in 2013, $607 Million in 2014, and $610 Million in 2015.

Combining the voices of *cost of revenue* (TAC and other) and leaving the depreciation expenses and the fees paid to Mozilla apart, the cost of revenue accounted for approximately 24% of revenues in 2015. The model assumes that for the forecasted period 2016-2023 this percentage stays constant. Even if in the past years this percentage was lower, the fact that the Company has strived to attract customers on its properties suggests that 24% is a more appropriate forecast.

Sales & marketing expenses consists in advertising and marketing costs, and costs related to sales and travel (Yahoo annual report, 2015). In 2015, it accounted for 22% of revenues, while in

2014 and in 2013 it was the 24% and 23% respectively (Yahoo annual report, 2015). The model assumes that Sales and marketing expenses in the future will be 23.68% of revenues, equal to the average percentage for the years 2012-2015. This choice comes from the fact that the model assumes that Marissa Mayer will continue to be the CEO of Yahoo and she will continue to invest in the product's promotion.

Product development expenses are those costs that the Company incurs to develop and maintain Yahoo Properties (Yahoo annual report, 2015). It accounted for $958 Million in 2013, $ 1,156 Million in 2014, and $ 1,178 Million in 2015 (Yahoo annual report, 2015). As a percentage of revenues, the value in 2015 was the 24% (Yahoo annual report, 2015). As for the Sales and marketing expenses, the model assumes that the Company will keep spending an amount equal to the 22.29% (average for the period 2012-2015) of revenues. This is consistent with the fact that the Company, in order to attract customers on its Properties, has to continuously research new solutions.

General and administrative expenses consist primarily in costs for corporate departments and fees for professional services (Yahoo annual report, 2015). The company spent $ 667 Million (14% of revenues) in 2013, $ 686 Million (15% of revenues) in 2014, and $ 688 Million (14% of revenues) in 2015 (Yahoo annual report, 2015). The model assumes that the physiognomy of the Company post spin-off will be simpler than that of the last years. This suggests that the Company will be able to save on General and administrative expenses. Therefore, the model uses 8.98% (value in 2009) to estimate this voice as a percentage of revenues.

Gains on sales of patents, Goodwill impairment charge, Restructuring charges, and Intangibles impairment charge, combined they represented the 3.5% of revenues in 2014 (Yahoo annual report, 2015). The value of 2015 is strongly biased by the exceptional goodwill impairment charge of $4.5 Billion. The model combines these expenses in a single voice of cost called "Other expenses", and assumes that the ratio "*Other expenses/Revenues"* will be 3.21% of future revenues, which is the average for the time frame 2012-2014.

Overall, each voice of cost is forecasted as a percentage of revenues. Since the value of total revenues depends on the outcome of the Random formula, the values of forecasted costs change every time the user presses F9 (recalc key in Excel). An example of forecasted costs is shown in the Exhibit 7.

Another important item to forecast, already anticipated above, is the depreciation, which can be computed assuming that the historical depreciation over net fixed assets stays constant (Beccalli, E., 2011). As a result, the model assumes that depreciation expenses will be equal to 38.46% of the value of Properties Plants and Equipment.

7.2.3. Capital Expenditures forecast

Capital expenditures are forecasted in relation to sales, under the consideration that the higher is the cash available due to higher sales, the higher is the ability to invest in additions to PP&E (Beccalli, E., 2011). The historical value of Capital expenditures over sales is 9.5%. The model assumes that this percentage stays constant over the years.

Even if the Company is divesting its physical assets outside the US, it is investing in new equipment to strengthen its presence in the local market. Indeed, the Company has invested $491 Million in 2015 in the US, a very high value if compared to the $25 Million and the $27 Million spent in EMEA and Asia respectively. Total capital expenditures in 2015 were approximately 37% higher than in 2014, and 10.9% of total sales in 2015 (Yahoo annual report, 2015). The assumption that Yahoo will keep investing 9.5% it is reasonable and even quite conservative.

7.2.4. Net Working Capital forecast

Net working capital for year n is computed as current assets (cash and cash equivalents are excluded) minus current liabilities (Beccalli, E., 2011). To forecast the net working capital, current assets and current liabilities have to be estimated for the time frame (Beccalli, E., 2011). Current assets and current liabilities are forecasted as a percentage of sales, and the historical ratios for the period 2009-2015 are used (Exhibit 8). The model than computes the net working capital for each year and finds the Change in Net working Capital by subtracting the value in year *n* from than of year *n+1*.

7.3. Assumptions

Besides the forecasting of the income statement and the balance sheet, the APV method requires to make assumptions about: (i) the discount rate that reflects the risk of the Company's free cash flows, (ii) the market cost of debt, and (iii) the long term growth rate used in the perpetuity formula.

Besides explaining how each assumption has been made, the following paragraph introduces the theory of the Capital Asset Pricing Model used to estimate the cost of equity.

7.3.1. Unlevered Cost of Equity Capital (K_u)

The discount rate needed to discount the free cash flows of the Company as if it was all equity financed is the cost of equity capital. A practical way to estimate this parameter is the use of the Capital Asset Pricing Model (CAPM). The CAPM builds on the "Markowitz mean-variance-efficiency" (Fama, French, 2004), according to which risk averse investors take in consideration only the expected returns and the variance of their variance (Fama, French, 2004). Moreover, these investors choose only efficient portfolios with minimum variance for a given level of expected return, and efficient portfolios with maximum expected return for a given variance (Fama, French, 2004).

The CAPM is very practical to estimate the expected return $E(R_i)$ on any security. It says that the expected return is equal to the risk-free rate plus a risk premium that depends on the security's systematic risk (Beccalli, E., 2011). The CAPM equation appears as below:

$$E(R_i) = r_f + \beta_E\left[E(r_M) - r_f\right]$$

Equation 19. CAPM model. *Source: Beccalli, E., 2011*

Where r_f denotes the risk-free rate, β_E indicates the systematic risk of the security, and $E(r_M)$ stands for the expected return of the market portfolio (Beccalli, E., 2011).

The estimation of these three parameters is necessary to find the cost of equity capital.

7.3.1.1. Risk Free Rate

Ideally, the risk-free rate can be estimated by looking at government default free bonds (Koller, T., Goedhart, M., & Wessels, D., 2010). For US based corporations, it is common to use the 10-year government STRIP because it may better match the Company's cash flows. Koller et al. (2010) recommends to use government bonds denominated in the same currency of the cash flows of

the corporation being valued. Moreover, it is generally recommended to not use short term Treasury bill when valuing a corporation or a long term project, since this approach would fail to recognize the possibility for the bondholder to reinvest at higher rates once the short-term bond are matured (Koller, et al., 2010).

Considered these few guidelines, in this work the data used are those of the 10-year Treasury bond collected from the Federal Reserve database (Damodaran A., 2015). The average historical annual return computed over the 1928-2015 time frame results to be 5.23% (Damodaran A., 2015). This value is used as the risk-free rate in the CAPM formula.

7.3.1.2. Expected market risk premium

The value of the market risk premium equals the difference between the market's expected return and the risk-free rate, $[E(r_M) - r_f]$ in the CAPM formula. Conceptually, this parameter indicates the ability of a stock to outperform government bonds over the years and it has several implications in the world of finance. Given its importance, different methods have evolved during the years to estimate the market risk premium, but none of them as gained universal acceptance and recognized superiority (Koller, et al., 2010). The multiplicity of methods can be grouped in three main categories: (i) historical returns to estimate the future, (ii) regression analysis that uses current market variable (Koller, et al., 2010), and (iii) reverse engineering of the market cost of capital from the DCF valuation (Koller, et al., 2010). Since none of these methodology is perfectly accurate, only the first category is analyzed and considered in this work. The historical market risk premium is calculated by computing the average of the differences between the returns of the market and those of the stock in each year of the time frame:

$$E(rM) = \frac{1}{n}\sum_{t=1}^{n}(r_M - r_f)_t$$

Equation 20. Historical market risk premium. *Source: Damodaran A., 2015*

The returns of the market are estimated by looking at the returns of the S&P500[8]. Once both the historical data for market and the risk free rate are collected (Exhibit 9), the differences for each year are computed, and the average is estimated. From this analysis, the historical market risk premium results to be 6.18%, if considered the time frame 1928-2015 (Damodaran A., 2015).

[8] The S&P 500 focuses on the large-cap sector of the market; however, since it includes a significant portion of the total value of the market, it also represents the market.

7.3.1.3. Beta

The Beta is company specific parameter because it represents a stock's incremental risk to a diversified investor (Koller, et al., 2010). In this context, risks means how much the stock "covaries" with the market: the higher the covariance, the higher the Beta. Even in this case, there is no a single approach for the estimation, but the literature recognize three of them as frequently used: (i) regression of the stock's returns against the market's returns, (ii) ratio of the covariance of the stock's return with the market's returns to the variance of the market's returns (Gruber, M. J., & Ross, S. A., 1978), and (iii) average beta of comparable firms.

In the analysis of Yahoo, the second method is used. The time frame considered is the 1996 (birth of the Company)-2015. The resulting Company Beta is approximately 1.74, computed as from the equation:

$$\beta = \frac{\sigma_{i,m}}{{\sigma_m}^2}$$

Equation 21. Beta estimation. *Source: Brealey R., et al., 2012*

where $\sigma_{i,m}$ is the covariance of the stock's returns with the market's returns, and ${\sigma_m}^2$ is the variance of the market returns. In the analysis of Yahoo, $\sigma_{i,m}$ results to be 0.00833, and ${\sigma_m}^2$ is 0.0048.

To find the cost of equity capital, the Beta required in the formula is the "unlevered Beta" (β_U), which is the Beta of the equity of the Company. This can be derived from the following equation:

$$\beta_U = \frac{\beta_L}{1 + \left((1 - T)\frac{D}{E}\right)}$$

Equation 22. Beta unlevered. *Source: Brealey R., et al., 2012*

where β_L is the Beta levered, *T* is the tax rate, *D* is the value of debt, and *E* is the value of equity (Brealey R., et al., 2012).

The β_U of Yahoo computed as explained above is 1.695. This value of β_U, together with those of the other estimated inputs, are used in the CAPM formula to compute the cost of equity capital, which results to be 15.7%. The cost of equity capital used for the analysis is therefore 15.7%.

7.3.2. Market Cost of Debt

The cost of debt is used in the APV formula to discount to the present the tax advantages that the corporations obtain from holding debt (Bruner, R., Eades, K., Harris, R., & Higgins, R., 1998). The idea behind is that the risk of the tax advantages have the same risk of the debt that generate them (Bruner, et al., 1998). The cost of debt should be estimated on the base of the market interest rates (Bruner, et al., 1998). From the Company's Annual Report it is acknowledged that the interest rate paid on the convertible notes, the only form of debt the Company holds, is 5.26% (Yahoo annual report, 2015).

In the FY 2015 the Company paid $71,865 Thousands in interest expenses, and recorded a total debt of $1,233 Million (Yahoo annual report, 2015). If the ratio between the interest expenses and the total debt is computed, the interest expenses result to be 5.83% of the total debt. The remaining of the analysis considers that the market cost of debt at December 2015 has a value close to 5.83%.

7.3.3. Long Term Growth Rate

The long term growth rate has been already discussed in the forecast's section. The assumed bottom and up value of the range chosen as the input for the growth rate are -1% and +5%. Indeed, this is the rate at which the FCFs are assumed to grow from year 2023 to the infinite.

7.4. Valuation

"Valuation is the process of converting forecasts into an estimate of the value of the firm" (Beccalli, E., 2011).

Once forecasted the income statement and the balance sheet, and made the assumptions for the APV methodology, the models combine all the "ingredients" to estimate the Company's free cash flows and find the intrinsic value of the Company.

The free cash flows are calculated as the after-tax operating income, plus non-cash expenses (e.g. depreciation), minus investments in operating working capital and in PP&E (Beccalli, E., 2011). The FCF calculation is illustrated in Figure 6.

	Earnings before interests and taxes (EBIT)
-	Cash tax on EBIT
=	Net operating profits less adjusted taxes
+	Depreciation
+	Amortisation
-	Increase in working capital
=	Cash from operations
-	Cash investments (= CAPEX + Increase in net other assets)
=	FCF (available to equity-holders and debt-holders)
+	Cash associated to debt financing (= Debt issues – Debt repayments – Net interest expense after taxes)
=	FCF available to equity-holders (FCFE)
+	Cash to/from shareholders (= Stock issuance – Stock repurchase – Net dividends)
=	Net increase/decrease in cash balance

Figure 6. FCF estimation. *Source: Beccalli E., 2011*

The complete valuation of Yahoo is shown in the Exhibit 10 (Note that what is shown is only one among the many possible scenarios).

The Free Cash Flows are estimated for each year of the time frame (2016-2023), and discounted back to the year 2015. The terminal value is computed by plugging the value of the Free Cash Flow in year 2022 as in the perpetuity formula. This equation shows this step in the specific:

$$TV_{2023} = \frac{FCF_{2023}(1+g)}{(K_u - g)}$$

Equation 23. Terminal Value of the Free Cash Flows. *Source: own construction*

where TV_{2023} is the terminal value in year 2023. This value is then discounted to the 2015 according to the usual discount formula.

The value of the company as if all equity financed is estimated by summing the Present Value of the forecasted cash flows and the Present Value of the terminal value.

As introduced above in this work, the APV equation says that the value of the Company is given by the sum of the Company as if all equity financed and the value of the tax shields.

The calculation of the present value of the tax shields is based on the Equation 4. All the input are already known: the value of the Convertible Notes is assumed to remain stable at $1,234 Million until the 2018, the interest rate paid on the Notes is 5.26% as from the Company annual report (2015), the market cost of debt is estimated to be 5.88%, and the Federal Tax rate is 35%. Figure 7 shows the computation of the present value of the Company's tax shield.

		2016	2017	2018	
Debt		1233.5	1233.5	1233.5	
Tax shield		22.7	22.7	22.7	$= T_c * Debt * K_d$
Discounted Tax shield		21.45	20.26	19.13	
PV Tax shields	60.8				

Figure 7. Present value of Yahoo's tax shields (Data in $ Million). *Source: Own construction*

The sum of the PV of the company as all equity financed and the PV of the tax shields is input in a new cell in Excel, and simulated using Palisade @RISK. Using the formula "Riskoutput"

$$= RISKOUTPUT()$$

Formula 4. Riskoutput formula**.** *Source: Palisade.com, 2015*

and by setting the number of simulations to 10,000, @RISK generates a probability distribution using the 10,000 values generated by the simulation. In another cell is input the formula "Riskmean"

$$= RISKMEAN()$$

Formula 5. Riskmean formula**.** *Source: Palisade.com, 2015*

This formula using as its argument the cell containing the Riskoutput formula, gives as a result the mean value of the simulation, which in this case is the Expected value of the Company.

7.5. Results

The result of the simulation is shown in Figure 8.

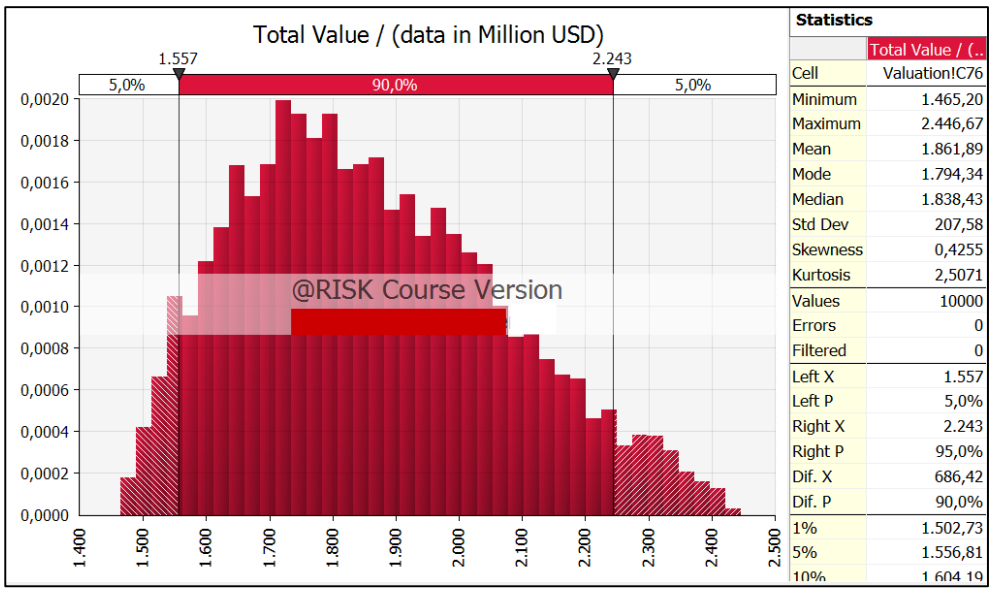


Figure 8. @RISK output for Yahoo value. *Source: Palisade @RISK*

The first result of the valuation is the analysis is that the mean value, or the Expected Value of the Company, is approximately $1.862 Billion. This is very important, because it shows that Yahoo, as a standalone entity, has a positive enterprise value, a result that proves that The Hypothesis of this work is true.

Other conclusions can be drawn from the Monte Carlo simulation. The Company Value is distributed among a relatively narrow range: $1.465 Billion, $2.446 Billion. The probability that the Enterprise value is out of this range is approximately zero, and the probability that Yahoo is worth less than $1.6 Billion is lower than 10%. On the other hand, there is only 10% chance that the enterprise value is higher than $2.16 Billion.

Ultimately, observing the shape of the probability distribution of the enterprise value (Figure 8), it emerges that this is similar to that of a normally distributed variable.

According to Panik (2012), "a continuous random variable X has a normal distribution if its probability density function is bell-shaped (Figure 9), symmetrical about its mean μ, and asymptotic to the X".

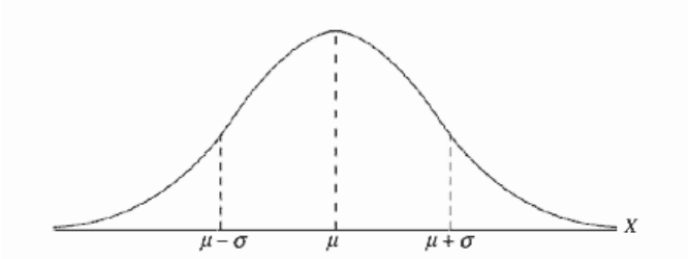


Figure 9. Probability density function of a normal distribution. *Source: Panik, M. J., 2012*

To verify the suggestion that the estimated enterprise value is normally distributed, two proof are found: one numerical, and one visual proof.

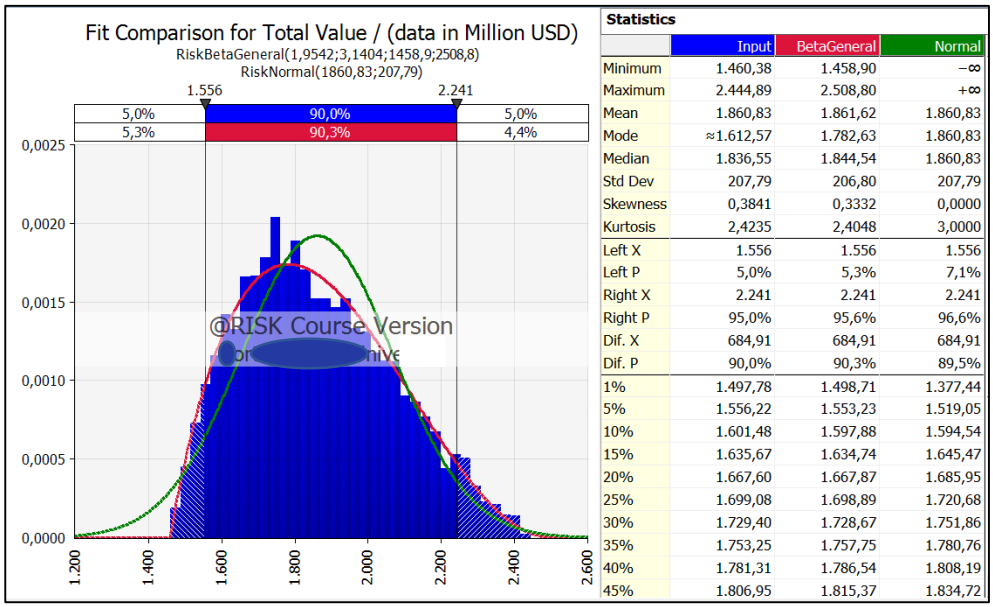
Starting with the numerical proof. Assuming a Normal distribution, and applying the common rule that the 68% confidence interval is comprised within one standard deviation from the mean (Panik, M. J., 2012), a very similar range would be obtained:

$$IC_{68\%} = (\mu \pm \sigma) = (1{,}861M \pm 208M) = (1{,}653M; 2{,}069M)$$

Equation 24. Confidence interval at 68%. *Source: own construction*

As it can be observed, the Exhibit 11 shows that the enterprise value has, with a 68% probability, a value between $1.645 Billion and $2.085 Billion. The 68% confidence interval assuming a normal distribution gives a range that is extremely similar to the 68% probability range obtained by the Monte Carlo simulation. Therefore, it seems as if the enterprise value is distributed according to a Normal distribution.

The second proof can be found in the comparison between the probability density function of the case-specific simulation and that of the normal distribution (Figure 10).



Statistics	Input	BetaGeneral	Normal
Minimum	1.460,38	1.458,90	−∞
Maximum	2.444,89	2.508,80	+∞
Mean	1.860,83	1.861,62	1.860,83
Mode	≈1.612,57	1.782,63	1.860,83
Median	1.836,55	1.844,54	1.860,83
Std Dev	207,79	206,80	207,79
Skewness	0,3841	0,3332	0,0000
Kurtosis	2,4235	2,4048	3,0000
Left X	1.556	1.556	1.556
Left P	5,0%	5,3%	7,1%
Right X	2.241	2.241	2.241
Right P	95,0%	95,6%	96,6%
Dif. X	684,91	684,91	684,91
Dif. P	90,0%	90,3%	89,5%
1%	1.497,78	1.498,71	1.377,44
5%	1.556,22	1.553,23	1.519,05
10%	1.601,48	1.597,88	1.594,54
15%	1.635,67	1.634,74	1.645,47
20%	1.667,60	1.667,87	1.685,95
25%	1.699,08	1.698,89	1.720,68
30%	1.729,40	1.728,67	1.751,86
35%	1.753,25	1.757,75	1.780,76
40%	1.781,31	1.786,54	1.808,19
45%	1.806,95	1.815,37	1.834,72

Figure 10. @RISK output for Yahoo value (1). *Source: Palisade @RISK*

The comparison between the two curves shows the clear similarity between the two distributions. It could be concluded that the enterprise value is almost normally distributed with a mean of $1.86 Million and a standard deviation of $209 Million.

This last finding can be explained by the *Central Limit Theorem (CLT)*. The CLT says that if X is a random variable and $X_1, X_2, .., X_n$ are independent and with the same distribution of X, then the distribution of S: $\sum_{i=1}^{n} X_i$ tends to that of a Normal distribution (Lefebvre, M., 2009). In very simple terms, the CLT concludes normality regardless of the shape of the distribution of the X_i's. In this work, with an n equal to 10,000, the final result it is almost normally distributed even if the X_i's produced by the Random formula have a Uniform distribution.

8. Conclusions

The result of the analysis has confirmed the Hypothesis that Yahoo Sub, a new entity which includes only Yahoo's core business, would have a positive enterprise value. It is therefore recommendable to the management to execute the reverse spin-off strategy as planned at the end of the 2015.

The qualitative analysis has demonstrated how the spin-off could tackle many of the problems that related to the case of Yahoo, such as the information asymmetry and the conglomerate discount. Indeed, investors find very difficult to assess the Company's strategy because of its "confused" products' offer, which has been fueled by the acquisitions of several start-ups. Moreover, the fact that the Company is composed by three very different parts could make its correct valuation very hard for investors.

The financial analysis, has demonstrated how the Company could bring its profit's margins positive again by catching the mobile opportunity and cutting unnecessary costs. In the most ideal perspective, Yahoo Sub would be a very agile entity, with low fixed costs, and focused on few promising services. As a stand-alone firm, Yahoo Sub will not have to manage anymore its relationships with Yahoo Japan and Alibaba, which at today are monopolizing the attention of the management and the market, and it will be able to save on general administrative expenses. Overall, more focus on the revenues side, and a slightly more efficient cost structure, could turn Yahoo profitable again.

The last good reason to execute the reverse spin-off is that this strategy meets the interests of shareholders and active investors, whose first concern is that of choosing the most tax efficient transaction maximizing their return on investment. A different strategy could be perceived negatively from the market which could apply a further discount to the valuation of the Company.

Secondary conclusions refer the use of the software @RISK and the theory of the trinomial tree to run accurate valuations. Even if this work didn't want to propose a new way to run simulations, it may be relevant to mention that the experience of running a simulation on the Company's penetration rate instead of simple forecasting the revenues growth rates partially reduced the burden of making limiting and risky assumptions.

Further researches might want to test or improve the introduced method for forecasting, verifying whether the decomposition of the revenues in market share and penetration rate can lead practitioners to more precise forecasts.

9. Limitations

This analysis, has several important limitations that it is worth to mention.

First of all, this study ignores all the possible courses of action that Yahoo may undertake, and consider the spin-off as the only possible choice. The analysis isolates the problem as it is at December 2015, and does not take in consideration news and information beyond the 2015 besides the annual report that came out at the beginning of the 2016.

The PEST and Porter's Five Forces analysis have been focused only on the aspects that have a major impact on the Company strategy, overlooking several other minor considerations. The reason behind this decision was to avoid too much detail that was marginally relevant to the analysis and the final objective.

The methodology used to forecast revenues it is based on personal intuition and it doesn't find recognition in the existent literature or in previous applications in the industry. However, it builds on widely accepted theories such as the binomial and trinomial trees, and the full information forecasting. The reason why a large section of this work has been dedicated to the explanation of this methodology it is based on the personal sense that in the specific case of Yahoo historical data were not sufficient to realistically forecast revenues. Indeed, this work imagines a post spin-off entity that is, for some aspects, different from the Company's core business as at December 2015. The use of historical data could have misrepresented the potential of the new entity, while the use of external sources as the size of the market and the Company's market share might have given a more objective representation of how the new firm could perform in the future. However, there is no definitive proof that confirms that this method is superior to simple forecasting. A valid proof would ensure that the data of the future size of the markets are accurate, and it would establish that predicting the growth of the penetration rate is an easier task than predicting revenues' growth.

The estimated value of the Company, as computed in this work, ignores the bankruptcy costs. These are the costs that the firm incurs in case it defaults on its debt, and they can be very high if the firm has a substantial amount of debt in its balance sheet. In the case of Yahoo, since the level of debt is very low, bankruptcy costs are assumed to be zero.

The costs associated with the spin-off such as those introduced in the literature review section (e.g. registration costs, costs of new shares' distribution, and lost synergies) are not taken in consideration in the analysis. While some of them usually marginally impact on the final decision, the lost value of synergies might result crucial in some cases. However, in the case of Yahoo, after careful considerations, no synergies have been identified among the core business, Yahoo Japan and Alibaba stakes.

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Exhibits

Exhibit 1- Yahoo's Income Statement

	Years Ended December 31,						
	2009	2010	2011	2012	2013	2014	2015
	(In thousands, except per share amounts)						
Revenue	$ 6,460,315	$ 6,324,651	$ 4,984,199	$ 4,986,566	$ 4,680,380	$ 4,618,133	$ 4,968,301
Operating expenses:							
Cost of revenue-traffic acquisition costs	2,871,746	2,627,545	1,502,650	518,906	254,442	217,531	877,514
Cost of revenue-other				1,101,660	1,094,938	1,080,783	1,200,234
Sales and marketing	1,245,350	1,264,491	1,122,302	1,101,572	1,130,820	1,234,268	1,080,718
Product development	1,210,168	1,082,176	1,005,090	885,824	1,008,487	1,207,146	1,177,923
General and administrative	580,352	488,332	495,804	540,247	569,555	574,743	687,804
Amortization of intangibles	39,106	31,626	33,592	35,819	44,841	66,750	79,042
Gains on sales of patents	-	-	-	-	-79,950	-97,894	-11,100
Goodwill impairment charge	-	-	-	-	63,555	88,414	4,505,218
Restructuring charges, net	126,901	57,957	24,420	236,170	3,766	103,450	104,019
Intangibles impairment charge	-	-	-	-	-	-	15,423
Total operating expenses	6,073,623	5,552,127	4,183,858	4,420,198	4,090,454	4,475,191	9,716,795
Income from operations	**386,692**	**772,524**	**800,341**	**566,368**	**589,926**	**142,942**	**-4,748,494**
Other income, net	187,528	297,869	27,175	4,647,839	43,357	10,369,439	-75,782
Income before income taxes and earnings in equity interests	574,220	1,070,393	827,516	5,214,207	633,283	10,512,381	-4,824,276
Provision for income taxes	-219,321	-221,523	-241,767	-1,940,043	-153,392	-4,038,102	89,598
Earnings in equity interests, net of tax	250,390	395,758	476,920	676,438	896,675	1,057,863	383,571
Net income	**605,289**	**1,244,628**	**1,062,669**	**3,950,602**	**1,376,566**	**7,532,142**	**-4,351,107**
Net income attributable to noncontrolling interests	-7,297	-12,965	-13,842	-5,123	-10,285	-10,411	-7,975
Net income attributable to Yahoo! Inc.	$ 597,992	$ 1,231,663	$ 1,048,827	$ 3,945,479	$ 1,366,281	$ 7,521,731	$ (4,359,082)
Net income attributable to Yahoo! Inc. common stockholders per share-basic	$ 0.43	$ 0.91	$ 0.82	$ 3.31	$ 1.30	$ 7.61	
Net income attributable to Yahoo! Inc. common stockholders per share-diluted	$ 0.42	$ 0.90	$ 0.82	$ 3.28	$ 1.26	$ 7.45	$ (4.64)
Shares used in per share calculation-basic	1,397,652	1,354,118	1,274,240	1,192,775	1,052,705	987,819	
Shares used in per share calculation-diluted	1,415,658	1,364,612	1,282,282	1,202,906	1,070,811	1,004,108	939,141
Stock-based compensation expense by function:							
Cost of revenue-other	$ 10,759	$ 3,275	$ 3,489	$ 10,078	$ 15,545	$ 33,560	$ 32,010
Sales and marketing	141,537	71,154	65,120	82,115	101,852	154,372	141,418
Product development	205,971	106,665	89,587	74,284	83,396	139,056	190,454
General and administrative	79,820	42,384	45,762	57,888	77,427	93,186	93,271
Restructuring reversals, net	11,062	-4,211	214	-3,429	-	-	2,705
Supplemental Financial Data:							
Revenue ex-TAC							$ 4,090,787
Adjusted EBITDA							$ 951,740
Free cash flow(2)							$ (3,010,172)

Source: Yahoo Website (2016)

Exhibit 2- Yahoo's Balance Sheet

	Years Ended December 31,						
	2009	2010	2011	2012	2013	2014	2015
	(in thousands, except per share amounts)						
ASSETS							
Current assets:							
Cash and cash equivalents	$ 1,275,430	$ 1,526,427	$ 1,562,390	$ 2,667,778	$ 2,077,590	$ 2,667,916	$ 1,631,911
Short-term marketable securities	2,015,655	1,357,661	493,189	1,516,175	1,330,304	5,327,412	4,225,112
Accounts receivable, net of allowance of $35,549 and $39,799 as of December 31, 2013 and 2014, respectively	1,003,362	1,028,900	1,037,474	1,008,448	979,559	1,032,704	1,047,504
Prepaid expenses and other current asset	300,325	432,560	359,483	460,312	638,404	671,075	602,792
Total current assets	4,594,772	4,345,548	3,452,536	5,652,713	5,025,857	9,699,107	7,507,319
Long-term marketable securities	1,226,919	744,594	474,338	1,838,425	1,589,500	2,230,892	975,961
Property and equipment, net	1,426,862	1,653,422	1,730,888	1,685,845	1,488,518	1,487,684	1,547,323
Goodwill	3,640,373	3,681,645	3,900,752	3,826,749	4,679,648	5,163,654	808,114
Intangible assets, net	355,883	255,870	254,600	153,973	417,808	470,842	347,269
Other long-term assets and investments	194,933	235,136	220,628	289,130	177,281	550,798	342,390
Investment in Alibaba Group	-	-	-	816,261	-	39,867,789	31,172,361
Investments in equity interests	3,496,288	4,011,889	4,749,044	2,840,157	3,426,347	2,489,578	2,503,229
Total assets	$14,936,030	$14,928,104	$14,782,786	$17,103,253	$16,804,959	$61,960,344	$45,203,966
LIABILITIES AND EQUITY							
Current liabilities:							
Accounts payable	$ 136,769	$ 162,424	$ 166,595	$ 184,831	$ 138,031	$ 238,018	$ 208,691
Income taxes payable related to sale of Alibaba Group ADSs	-	-	-	-	-	3,282,293	-
Other accrued expenses and current liabil	1,169,815	1,208,792	846,044	808,475	907,782	671,307	934,658
Deferred revenue	411,144	254,656	194,722	296,926	294,499	336,963	134,031
Total current liabilities	1,717,728	1,625,872	1,207,361	1,290,232	1,340,312	4,528,581	1,277,380
Convertible notes					1,110,585	1,170,423	1,233,485
Long-term deferred revenue	122,550	56,365	43,639	407,560	258,904	20,774	27,801
Other long-term liabilities	83,021	142,799	134,905	124,587	116,605	143,095	118,689
Deferred tax liabilities related to investment in Alibaba Group	-	-	-	-	-	16,154,906	12,611,867
Deferred and other long-term tax liabilities	494,095	506,658	815,534	675,271	847,956	1,156,973	855,324
Total liabilities	2,417,394	2,331,694	2,201,439	2,497,650	3,674,362	23,174,752	16,124,546
Commitments and contingencies (Note 12)							
Yahoo! Inc. stockholders' equity:							
Preferred stock, $0.001 par value; 10,000 shares authorized; none issued or outstanding	-	-	-	-	-	-	-
Common stock, $0.001 par value; 5,000,000 shares authorized; 1,019,812 shares issued and 1,014,338 shares outstanding as of December 31, 2013, and 949,771 shares issued and 936,838 shares outstanding as of December 31, 2014	1,410	1,306	1,242	1,187	1,015	945	
Additional paid-in capital	10,640,367	10,109,913	9,825,899	9,563,348	8,688,304	8,496,683	
Treasury stock at cost, 5,474 shares as of December 31, 2013, and 12,933 shares as of December 31, 2014	-117,331	-	-416,237	-1,368,043	-200,228	-712,455	
Retained earnings	1,599,638	1,942,656	2,432,294	5,792,459	4,267,429	8,937,036	
Accumulated other comprehensive income	369,236	504,254	697,869	571,249	318,389	22,019,628	
Total Yahoo! Inc. stockholders' equity	12,493,320	12,558,129	12,541,067	14,560,200	13,074,909	38,741,837	29,043,537
Noncontrolling interests	25,316	38,281	40,280	45,403	55,688	43,755	35,883
Total equity	12,518,636	12,596,410	12,581,347	14,605,603	13,130,597	38,785,592	29,079,420
Total liabilities and equity	$14,936,030	$14,928,104	$14,782,786	$17,103,253	$16,804,959	$61,960,344	$45,203,966

Source: Yahoo Website (2016)

Exhibit 3- Yahoo's Cash Flow Statement

	Years Ended December 31,		
	2013	2014	2015
	(in thousands)		
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net income (loss)	$ 1,376,566	$ 7,532,142	$ (4,351,107)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation	532,485	475,031	472,894
Amortization of intangible assets	96,518	131,537	136,719
Accretion of convertible notes discount	4,846	59,838	63,061
Stock-based compensation expense	278,220	420,174	459,858
Non-cash asset impairment charge	-	-	44,381
Non-cash goodwill impairment charge	63,555	88,414	4,460,837
Non-cash intangibles impairment charge	-	-	15,423
Non-cash restructuring charges (reversals)	547	-3,394	3,150
Non-cash accretion on marketable securities	36,985	30,878	47,218
Foreign exchange (gain) loss	-10,852	15,978	4,376
Gain on sale of assets and other	-3,736	-11,383	-2,878
Gain on sale of Alibaba Group ADSs	-	-10,319,437	-
Gain on sales of patents	-79,950	-97,894	-11,100
(Gain) loss on Hortonworks warrants	-	-98,062	19,199
Earnings in equity interests	-896,675	-1,057,863	-383,571
Dividend income related to Alibaba Group Preference Shares	-35,726	-	-
Tax benefits from stock-based awards	49,061	145,711	41,729
Excess tax benefits from stock-based awards	-64,407	-149,582	-58,282
Deferred income taxes	-84,302	465,873	-42,341
Dividends received from equity investees	135,058	83,685	142,045
Changes in assets and liabilities, net of effects of acquisitions:			
Accounts receivable	26,199	29,278	-39,065
Prepaid expenses and other	27,401	-82,419	21,842
Accounts payable	-7,764	14,165	-59,965
Accrued expenses and other liabilities	-98,853	156,307	109,776
Incomes taxes payable related to sale of Alibaba Group ADSs	-	3,282,293	-3,282,293
Deferred revenue	-149,929	-194,920	-195,328
Net cash provided by (used in) operating activities	1,195,247	916,350	-2,383,422

	2013	2014	2015
		(in thousands)	
CASH FLOWS FROM INVESTING ACTIVITIES:			
Acquisition of property and equipment	-342,971	-413,019	-554,163
Proceeds from sales of property and equipment	4,840	17,404	11,176
Purchases of marketable securities	-3,223,190	-7,890,092	-5,206,245
Proceeds from sales of marketable securities	$2,871,834	$2,269,659	$ 822,997
Proceeds from maturities of marketable securities	748,915	945,696	6,691,645
Proceeds from sale of Alibaba Group ADSs, net of underwriting discounts, commissions, and fees	-	9,404,974	-
Proceeds related to the redemption of Alibaba Group Preference Shares	800,000	-	-
Acquisitions, net of cash acquired	-1,247,544	-859,036	-175,693
Proceeds from sales of patents	79,950	86,300	29,100
Purchases of intangible assets	-2,500	-2,658	-4,811
Proceeds from settlement of derivative hedge contracts	312,266	254,496	147,179
Payments for settlement of derivative hedge contracts	-22,708	-5,454	-8,817
Payments for equity investments in privately held companies	-4,226	-74,399	-
Other investing activities, net	2,113	4,630	-256
Net cash (used in) provided by investing activities	-23,221	3,738,501	1,752,112
CASH FLOWS FROM FINANCING ACTIVITIES:			
Proceeds from issuance of common stock	353,267	308,029	59,130
Repurchases of common stock	-3,344,396	-4,163,227	-203,771
Proceeds from issuance of convertible notes	1,412,344	-	-
Payments for note hedges	-205,706	-	-
Proceeds from issuance of warrants	124,775	-	-
Excess tax benefits from stock-based awards	64,407	149,582	58,282
Tax withholdings related to net share settlements of restricted stock units	-139,815	-280,879	-257,731
Distributions to noncontrolling interests	-	-22,344	-15,847
Proceeds from credit facility borrowings	150,000	-	-
Repayment of credit facility borrowings	-150,000	-	-
Other financing activities, net	-8,760	-13,627	-17,321
Net cash used in financing activities	-1,743,884	-4,022,466	-377,258
Effect of exchange rate changes on cash and cash equivalents	-18,330	-45,877	-23,619
Net change in cash and cash equivalents	-590,188	586,508	-1,032,187
Cash and cash equivalents at beginning of period	2,667,778	2,077,590	2,664,098
Cash and cash equivalents at end of period	$2,077,590	$2,664,098	$1,631,911

Source: Yahoo Website (2016)

Exhibit 4- Key ratios of comparable firms

	% Margin		P/S	P/B	P/E
	2014	2015			
Alphabet Inc (USD)	25	25.82		4.4	34.5
Facebook Inc (USD)	40.1	34.72	19.4	7.4	110.2
Baidu Inc (USD,CNY)	26.1	17.58	5.9	9.4	29.8
Naspers Ltd (USD,ZAR)	3.22	2.18	10.6	8.5	62
JD.com Inc (USD,CNY)	-5.05	-3.56	1.3	6.2	
LinkedIn Corp (USD)	1.63	-5.05	8.8	5.8	
NetEase Inc (USD,CNY)	40.7	31.89	7.3	4.9	22.8
Twitter Inc (USD)	38.4	-20.3	5.4	2.6	
TripAdvisor Inc (USD)	27.3	15.55	6.7	7.3	42.5

Exhibit 5- Trinomial tree for revenues forecasting

Trinomial tree for revenues forecasting

INPUT

US			**WW**		
sigma	1.348%		sigma	0.3644%	
u	1.013570208		u	1.0036508	
d	0.986611477		d	0.9963625	
m			m		
pu	0.496630312		pu	0.499089	
pd	0.503369688		pd	0.500911	
M	-0.000157339		M	-1.15E-05	
Sigmax	0.023346239		sigmax	0.0063118	
		Cumulative			Cumulative
pu	0.166588009	0.166588	pu	0.1666609	0.1666609
pd	0.166745349	0.3333334	pd	0.1666724	0.3333333
pm	0.666666642	1	pm	0.6666667	1

OUTPUT

		2015	**2016**	**2017**	**2018**	**2019**
New(stdev)	US		2.3644%	2.1989%	2.0641%	1.9592%
New(stdev)	WW		1.2157%	1.4649%	1.5735%	1.6213%
Rand()			*0.713418*	*0.64137697*	*0.818656*	*0.2407371*
u			1.0239257	1.02223255	1.020855	1.0197854
d			0.9766333	0.97825098	0.979571	0.9805985
US pen rate		**12.725%**	**12.725%**	**12.725%**	**12.725%**	**12.465%**
u			1.0122315	1.01475661	1.0158593	1.0163455
d			0.9879163	0.98545798	0.9843883	0.9839174
WW pen rate		**0.4000%**	**0.4000%**	**0.4000%**	**0.4000%**	**0.3937%**

Exhibit 6- Revenues from search advertising (mobile) forecasting

Mobile					Probability	Cumulative	*Scenario1-growth at industry rate*			
	2012	**2013**	**2014**	**2015**			**2016**	**2017**	**2018**	**2019**
Revenues (Millions)			768	1048			1474.78	1820.45	2116.55	2439.77
Monthly users	250	400	575	785			1083	1310	1493	1688
Rev/user			1.34	1.34			1.36	1.39	1.42	1.45
g		60.00%	43.75%	36.46%	0.33333333	0.33333333	37.96%	21.02%	13.99%	13.01%
							Scenario1-growth > Industry			
							2016	**2017**	**2018**	**2019**
							1515.36	1852.07	2142.52	2467.86
							1112	1333	1512	1707
							1.36	1.39	1.42	1.45
					0.33333333	0.66666667	41.76%	23.12%	15.38%	14.31%
							Scenario1-growth < Industry			
							2016	**2017**	**2018**	**2019**
							1434.20	1788.84	2090.58	2411.68
							1053	1287	1475	1668
							1.36	1.39	1.42	1.45
					0.33333333	1	34.17%	18.92%	12.59%	11.71%
				Simulate->	0.19784318					
				Outcome			37.96%	21.02%	13.99%	13.01%

Exhibit 7- Costs forecasting

Costs forecast	Historical data							First stage forecast				Second stage			Perpetuity
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cost of revenue(2)	2871.746	2627.545	1502.65	1620.566	1349.38	1298.314	2077.748	1426.669945	1523.586085	1647.12556	1768.962851	1937.7871	2091.1489	2256.4486	2437.5889
_TAC	*2871.746*	*2627.545*	*1502.65*	*518.906*	*254.442*	*217.531*	*502.514*	-	-	-	-	-			
__Firefox agreement ´14-	-	-	-	-	-	-	*375*	*375*	*375*	*375*	*375*	*412.5*	*412.5*	*412.5*	*412.5*
_Other	*0*	*0*	*0*	*452*	*466*	*474*	*700.234*	-	-	-	-	-			
__TAC+Other	-	-	-	-	-	-	-	*1051.669945*	*1148.586085*	*1272.12556*	*1393.962851*	1525.2871	1678.6489	1843.9486	2025.0889
Sales & marketing	1245.35	1264.491	1122.302	1101.572	1130.82	1234.268	1080.718	1345.243976	1469.21429	1627.239852	1783.088065	1951.0715	2147.2443	2358.6875	2590.3932
Sales & marktng/Rev (%)	19.28%	19.99%	22.52%	22.09%	24.16%	26.73%	21.75%	23.68%	23.68%	23.68%	23.68%	23.68%	23.68%	23.68%	23.68%
Product development	1210.168	1082.176	1005.09	885.824	1008.487	1207.146	1177.923	1266.129951	1382.80955	1531.541603	1678.224356	1836.3286	2020.9645	2219.9727	2438.0517
Prod devel/Rev (%)	18.73%	17.11%	20.17%	17.76%	21.55%	26.14%	23.71%	22.29%	22.29%	22.29%	22.29%	22.29%	22.29%	22.29%	22.29%
General and administrativ	580.352	488.332	495.804	540.247	569.555	574.743	687.804	616.2654517	673.0570993	745.4496886	816.844819	893.79917	983.66728	1080.5309	1186.6768
G&A/Sales (%)	8.98%	7.72%	9.95%	10.83%	12.17%	12.45%	13.84%	10.85%	10.85%	10.85%	10.85%	10.85%	10.85%	10.85%	10.85%
Other expenses	166.007	89.583	58.012	271.989	32.212	160.72	4677.179	182.2025378	198.9933254	220.3966241	241.505018	264.25703	290.82707	319.46536	350.84804
Other exp/Rev (%)	2.57%	1.42%	1.16%	5.45%	0.69%	3.48%	94.14%	3.21%	3.21%	3.21%	3.21%	3.21%	3.21%	3.21%	3.21%
TAC/Rev (%)		44.45%	41.54%	30.15%	10.41%	5.44%	4.71%								
(TAC+Other)/Rev (%)	44.452%	41.545%	30.148%	19.478%	15.396%	14.974%	24.208%								
Avg 12-15	18.51%														

Exhibit 8- Projected current assets and current liabilities

	2009	2010	2011	2012	2013	2014	2015	Pro-forma 2016	2017	2018	2019	2020	2021	2022	2023
	(in thousands, except per share amounts)														
ASSETS															
Current assets:															
Cash and cash equivalents	$ 1,275,430	$ 1,526,427	$ 1,562,390	$ 2,667,778	$ 2,077,590	$ 2,667,916	$ 1,631,911								
Short-term marketable securities	2,015,655	1,357,661	493,189	1,516,175	1,330,304	5,327,412	4,225,112								
Cash (%sales)	50.94%	45.60%	41.24%	83.90%	72.81%	173.13%	117.89%								
Accounts receivable, net of allowance of $35,549 and $39,799 as of December 31, 2013 and 2014, respectively	1,003,362	1,028,900	1,037,474	1,008,448	979,559	1,032,704	1,047,504	1,104,266	1,204,302	1,334,849	1,463,526	1,602,503	1,764,771	1,939,769	2,131,618
Acc Rec/sales	15.53%	16.27%	20.82%	20.22%	20.93%	22.36%	21.08%	20%							
Prepaid expenses and other current assets	300,325	432,560	359,483	460,312	638,404	671,075	602,792	549,150	598,897	663,818	727,809	796,923	877,618	964,644	1,060,050
Prep/exp %sales	5%	7%	7%	9%	14%	15%	12%	10%							
LIABILITIES															
Current liabilities:															
Accounts payable	$ 136,769	$ 162,424	$ 166,595	$ 184,831	$ 138,031	$ 238,018	$ 208,691	$ 193,453	$ 210,977	$ 233,848	$ 256,390	$ 280,737	$ 309,164	$ 339,821	$ 373,431
Acc Pay/sales	2%	3%	3%	4%	3%	5%	4%	3%							
Income taxes payable related to sale of Alibaba Group ADSs	-	-	-	-	-	3,282,293	-								
Other accrued expenses and current liabilities	1,169,815	1,208,792	846,044	808,475	907,782	671,307	934,658	991,108	1,080,893	1,198,063	1,313,554	1,438,290	1,583,929	1,740,994	1,913,184
	18%	19%	17%	16%	19%	15%	19%	18%							
Deferred revenue	411,144	254,656	194,722	296,926	294,499	336,963	134,031	294,055	320,693	355,457	389,722	426,730	469,941	516,541	567,628
	6%	4%	4%	6%	6%	7%	3%	5%							

Exhibit 9- Data set used to estimate the risk free rate and the expected market risk premium

Year	*S&P 500*	*3-month T.Bill*	*10-year T. Bond*
1928	43.81%	3.08%	0.84%
1929	-8.30%	3.16%	4.20%
1930	-25.12%	4.55%	4.54%
1931	-43.84%	2.31%	-2.56%
1932	-8.64%	1.07%	8.79%
1933	49.98%	0.96%	1.86%
1934	-1.19%	0.32%	7.96%
1935	46.74%	0.18%	4.47%
1936	31.94%	0.17%	5.02%
1937	-35.34%	0.30%	1.38%
1938	29.28%	0.08%	4.21%
1939	-1.10%	0.04%	4.41%
1940	-10.67%	0.03%	5.40%
1941	-12.77%	0.08%	-2.02%
1942	19.17%	0.34%	2.29%
1943	25.06%	0.38%	2.49%
1944	19.03%	0.38%	2.58%
1945	35.82%	0.38%	3.80%
1946	-8.43%	0.38%	3.13%
1947	5.20%	0.57%	0.92%
1948	5.70%	1.02%	1.95%
1949	18.30%	1.10%	4.66%
1950	30.81%	1.17%	0.43%
1951	23.68%	1.48%	-0.30%
1952	18.15%	1.67%	2.27%
1953	-1.21%	1.89%	4.14%
1954	52.56%	0.96%	3.29%
1955	32.60%	1.66%	-1.34%
1956	7.44%	2.56%	-2.26%
1957	-10.46%	3.23%	6.80%
1958	43.72%	1.78%	-2.10%
1959	12.06%	3.26%	-2.65%
1960	0.34%	3.05%	11.64%
1961	26.64%	2.27%	2.06%
1962	-8.81%	2.78%	5.69%
1963	22.61%	3.11%	1.68%
1964	16.42%	3.51%	3.73%

1965	12.40%	3.90%	0.72%
1966	-9.97%	4.84%	2.91%
1967	23.80%	4.33%	-1.58%
1968	10.81%	5.26%	3.27%
1969	-8.24%	6.56%	-5.01%
1970	3.56%	6.69%	16.75%
1971	14.22%	4.54%	9.79%
1972	18.76%	3.95%	2.82%
1973	-14.31%	6.73%	3.66%
1974	-25.90%	7.78%	1.99%
1975	37.00%	5.99%	3.61%
1976	23.83%	4.97%	15.98%
1977	-6.98%	5.13%	1.29%
1978	6.51%	6.93%	-0.78%
1979	18.52%	9.94%	0.67%
1980	31.74%	11.22%	-2.99%
1981	-4.70%	14.30%	8.20%
1982	20.42%	11.01%	32.81%
1983	22.34%	8.45%	3.20%
1984	6.15%	9.61%	13.73%
1985	31.24%	7.49%	25.71%
1986	18.49%	6.04%	24.28%
1987	5.81%	5.72%	-4.96%
1988	16.54%	6.45%	8.22%
1989	31.48%	8.11%	17.69%
1990	-3.06%	7.55%	6.24%
1991	30.23%	5.61%	15.00%
1992	7.49%	3.41%	9.36%
1993	9.97%	2.98%	14.21%
1994	1.33%	3.99%	-8.04%
1995	37.20%	5.52%	23.48%
1996	22.68%	5.02%	1.43%
1997	33.10%	5.05%	9.94%
1998	28.34%	4.73%	14.92%
1999	20.89%	4.51%	-8.25%
2000	-9.03%	5.76%	16.66%
2001	-11.85%	3.67%	5.57%
2002	-21.97%	1.66%	15.12%
2003	28.36%	1.03%	0.38%
2004	10.74%	1.23%	4.49%
2005	4.83%	3.01%	2.87%

2006	15.61%	4.68%	1.96%
2007	5.48%	4.64%	10.21%
2008	-36.55%	1.59%	20.10%
2009	25.94%	0.14%	-11.12%
2010	14.82%	0.13%	8.46%
2011	2.10%	0.03%	16.04%
2012	15.89%	0.05%	2.97%
2013	32.15%	0.07%	-9.10%
2014	13.52%	0.05%	10.75%
2015	1.36%	0.21%	1.28%

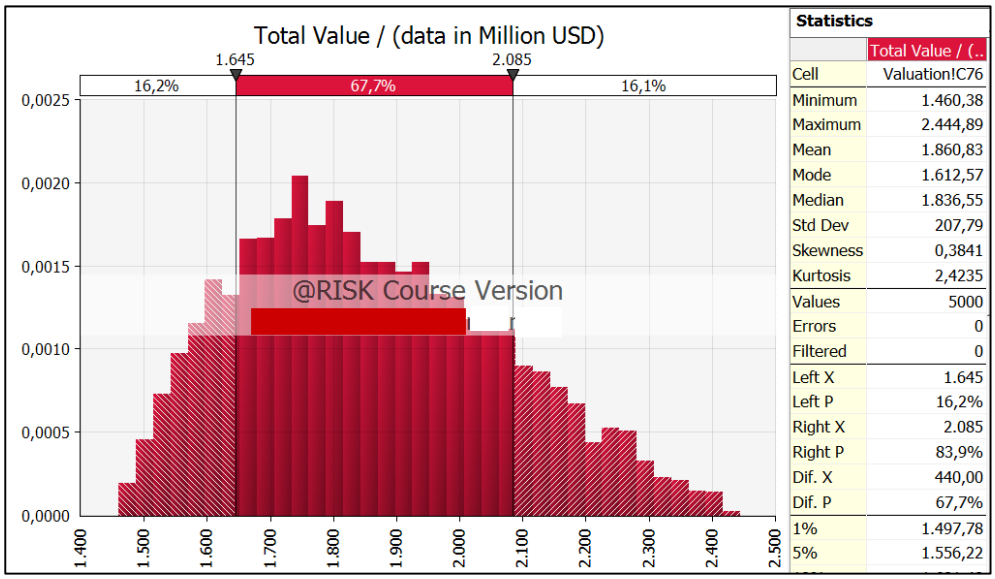
Source: Damodaran (2016)

Exhibit 10- Complete valuation sheet (data in $M)

	Historical data							Projections							
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
	(data in Million USD)														
Revenues	6460	6325	4984	4987	4680	4618	4968	5694.19	6220.44	6889.82	7586.23	8336.92	9210.66	10151.44	11179.53
(a) Search advertising	3396	3162	1853	1886	1742	1793	2084	2600.98	3032.45	3441.45	3868.89	4301.367798	4734.109	5162.758622	5583.47
_Rev (%)	*52.57%*	*49.99%*	*37.18%*	*37.82%*	*37.21%*	*38.82%*	*41.95%*	46%	49%	50%	51%	52%	51%	51%	50%
_growth rate		*-6.91%*	*-41.39%*	*1.77%*	*-7.64%*	*2.93%*	*16.25%*	25%	17%	13%	12%	11.2%	10.1%	9.1%	8%
_Mobile						768	1048	1445.86	1749.76	1994.47	2253.97				
_No mobile						1025	1036	1155.12	1282.69	1446.98	1614.91				
_US						781	789	881.71	974.58	1097.91	1224.26				
_ww						244	247	273.41	308.10	349.06	390.66				
(b) Display advertising	1867	2155	2160	2143	1950	1868	2074.16	2239.08	2254.92	2414.90	2579.41	2868.38	3187.06	3567.48	4030.92
_Rev (%)	*28.90%*	*34.07%*	*43.34%*	*42.97%*	*41.66%*	*40.45%*	*41.75%*	39%	36%	35%	34%	34%	35%	35%	36%
_growth rate		*15.42%*	*0.25%*	*-0.81%*	*-9.01%*	*-4.19%*	*11.03%*	8%	1%	7%	7%	11%	11%	12%	11%
_Mobile						189.7	425.9	756.10	990.70	1238.38	1532.49	1878.26	2280.85	2745.29	3276.35
_No mobile						1678	1648	1482.98	1264.22	1176.52	1046.92	990.13	906.21	822.19	754.56
(c) Other	1197	1008	971	958	989	957	810	854	933	1033	1138	1167	1289	1421	1565
_Rev (%)	*18.53%*	*15.94%*	*19.48%*	*19.21%*	*21.13%*	*20.73%*	*16.30%*	15%	15%	15%	15%	14%	14%	14%	14%
_growth rate		*-15.77%*	*-3.71%*	*-1.33%*	*3.22%*	*-3.19%*	*-15.38%*	5%	9%	11%	10%	3%	10%	10%	10%
Costs								4847.42	5260.75	5786.51	6333.50	6960.62	7646.89	8385.80	9193.30
Cost of revenue(2)	2872	2628	1503	1621	1349	1298	2078	1429.24	1526.67	1650.60	1779.54	1956.03	2117.79	2291.97	2482.31
_TAC	2872	2628	1503	519	254	218	878								
_other	0	0	0	1102	1095	1081	1200								
Cost of revenue/Rev (%)	*44%*	*42%*	*30%*	*32%*	*29%*	*28%*	*42%*								
Sales & marketing	1245	1264	1122	1102	1131	1234	1081	1348.53	1473.16	1631.69	1796.62	1974.40	2181.33	2404.13	2647.60
Sales & marktng/Rev (%)	*19%*	*20%*	*23%*	*22%*	*24%*	*27%*	*22%*								
Product development	1210	1082	1005	886	1008	1207	1178	1269.23	1386.53	1535.73	1690.96	1858.29	2053.04	2262.74	2491.90
Prod devel/Rev (%)	*19%*	*17%*	*20%*	*18%*	*22%*	*26%*	*24%*								
General and administrative	580	488	496	540	570	575	688	617.77	674.87	747.49	823.04	904.49	999.28	1101.35	1212.89
G&A/Sales (%)	*9%*	*8%*	*10%*	*11%*	*12%*	*12%*	*14%*								
Other expenses	166	90	58	272	32	161	4677	182.65	199.53	221.00	243.34	267.42	295.44	325.62	358.60
Other exp/Rev (%)	*3%*	*1%*	*1%*	*5%*	*1%*	*3%*	*94%*								
EBITDA								**847**	**960**	**1103**	**1253**	**1376**	**1564**	**1766**	**1986**
				38.51%	*42.24%*	*40.79%*	*32.31%*								
Deprection				649	629	607	500	619	645	672	700	730	756	787	820
EBIT								**227**	**315**	**431**	**552**	**646**	**807**	**979**	**1166**
Taxes	*38.19%*	*20.70%*	*29.22%*	*37.21%*	*24.22%*	*38.41%*		80	110	151	193	226	283	343	408
Net Income								**148**	**205**	**280**	**359**	**420**	**525**	**636**	**758**
CAPEX	434	714	593	506	338	372	543	539	589	652	718	789	872	961	820
CAPEX/sales	*6.71%*	*11.29%*	*11.90%*	*10.14%*	*7.22%*	*8.06%*	*10.93%*	9.47%							
Depreciation				649.267	628.778	606.778	500	619.40	644.98	671.95	700.37	730.30	756.41	786.79	820.46
NWC	-414	-164	190	179	278	457	373	176.68	193.01	213.78	235.39	258.68	285.80	314.99	315.92
Change in Net PPE								63.01	66.50	70.13	73.89	77.80	67.90	78.98	87.55
Changes in NWC								-196.23	16.33	20.77	21.61	23.29	27.11	29.19	0.94
FCF								424.4	121.73	189.48	263.53	318.81	429.78	528.08	669.26
Discounted FCFs								**366.83**	**90.93**	**122.33**	**147.04**	**153.74**	**179.12**	**190.22**	**322.73**
r	**0.16**														
g LT															
PV FCFs	**1250.20**														
PV Terminal value	**1500.8247**														
Estimated equity	**2751.023**														
APV															
Debt								1233.49	1233.49	1233.49					
Tax shields								22.71	22.71	22.71					
Tax rate	**35.00%**														
Present Value of Tax shields	**60.84**							21.45	20.26	19.13					
Total Value	**2811.86**														
E(V) _Risk Mean	**2811.86**														
Output-->	1.60%														

5.88% *Mkt rate of cost of debt*

Exhibit 11- 68%Confidence Interval



Statistics	
	Total Value / (..
Cell	Valuation!C76
Minimum	1.460,38
Maximum	2.444,89
Mean	1.860,83
Mode	1.612,57
Median	1.836,55
Std Dev	207,79
Skewness	0,3841
Kurtosis	2,4235
Values	5000
Errors	0
Filtered	0
Left X	1.645
Left P	16,2%
Right X	2.085
Right P	83,9%
Dif. X	440,00
Dif. P	67,7%
1%	1.497,78
5%	1.556,22

Source: Palisade @RISK