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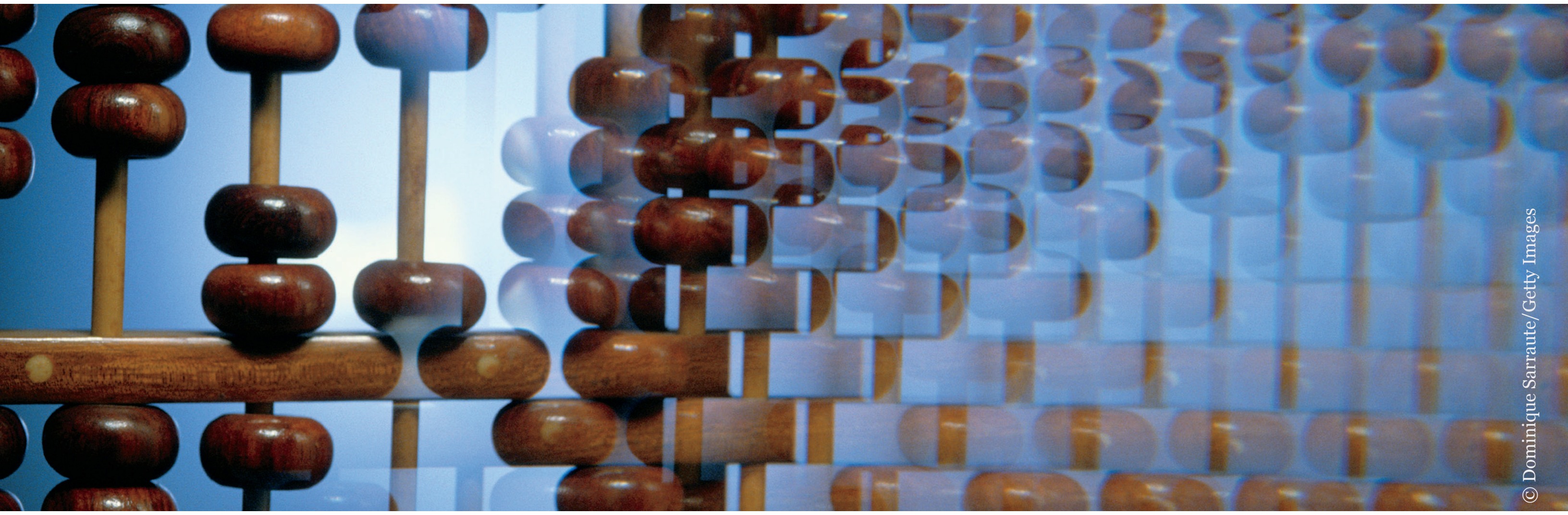


CORPORATE FINANCE

Valuing high-tech companies

It might feel positively retro to apply discounted-cash-flow valuation to hot start-ups and the like. But it's still the most reliable method.

Marc Goedhart, Tim Koller, and David Wessels

For the past several years, investors have once again been piling into shares of companies with fast growth and high uncertainty—especially Internet and related technologies. The rapid rise and sudden collapse of many such stocks at the end of the 20th century raised questions about the sanity of a stock market that appeared to assign higher value to companies the more their losses mounted. Now, amid signs that the current tech boom is wobbling, even the US Securities and Exchange Commission is getting into the act, announcing in late 2015 its plans to investigate how mutual funds arrive at widely varying valuations of privately held high-tech companies.

In the search for precise valuations critical to investors, we find that some well-established principles work just fine, even for high-growth companies like tech start-ups. Discounted-cash-flow valuation, though it may sound stodgily old school, works where other methods fail, since the core principles of economics and finance apply even in uncharted territories, such as start-ups. The truth is that alternatives, such as price-to-earnings or value-to-sales multiples, are of little use when earnings are negative and when there aren't good benchmarks for sales multiples. More important, these shorthand methods can't account for the unique characteristics of each company in a fast-changing environment, and they provide little insight into what drives valuation.

Although the components of high-tech valuation are the same, their order and emphasis differ from the traditional process for established companies: rather than starting with an analysis of the company's past performance, begin instead by examining the expected long-term development of the company's markets—and then work backward. In particular, focus on the potential size of the market and the company's market share as well as the level of return on capital the company might be able to earn. In addition, since long-term projections are highly uncertain, always value the company under different probability-weighted scenarios of how the market might develop under different conditions. Such techniques can help bound and quantify uncertainty, but they will not make it disappear: high-growth companies have volatile stock prices for sound reasons. What follows is an adaptation of analysis we published in 2015, using public data from 2014 and 2015.[1] The analyses herein are presented as an exercise to illustrate the methodology. They are not meant as a commentary on the current market situation and should not be used as the basis for trading in the shares of any company.

Start from the future

When valuing high-growth companies, start by thinking about what the industry and company might look like as the company evolves from its current high-growth, uncertain condition to a sustainable, moderate-growth state in the future. Then interpolate back to current performance. The future state should be defined and bounded by measures of operating performance, such as customer-penetration rates, average revenue per customer, sustainable margins, and return on invested capital. Next, determine how long hypergrowth will continue before growth stabilizes to normal levels. Since most high-growth companies are start-ups, stable economics probably lie at least 10 to 15 years in the future.

To demonstrate the valuation process for high-growth companies, let's walk through an abbreviated, potential valuation of Yelp, a popular online site for reviewing local businesses, using public data about the company. In 2014, approximately 545 million unique visitors wrote 18 million reviews on 2 million businesses. As the company explains in its annual report, "These reviews are written by people using Yelp to share their everyday local business experiences, giving voice to consumers and bringing 'word of mouth' online."

Originating in San Francisco, the company now serves around 150 cities around the world. Yelp's revenues between 2009 and 2014 grew more than tenfold from just under $26 million to $378 million, representing a compound annual growth rate of 71 percent. (Revenues in 2015 were up 48 percent over the previous year as of the third quarter.) To estimate the size of the potential market, start by assessing how the company fulfills a customer need. Then determine how the company generates (or plans to generate) revenues.

Understanding how a start-up makes money is critical. Many young companies build a product or service that meets the customer's need but cannot identify how to monetize the value they provide. Yelp provides end users with an extensive online forum to review the experiences of other customers when selecting a local business. Although Yelp provides a convenient service to the customer, today's Internet users often do not pay for online reviews.[2]

Instead of charging the end customer, Yelp sells local advertising to businesses that register on the website. A basic listing is free, but the company offers paid services, such as enhanced listings with photos and video, a sponsored search (where the company appears early in the consumer's search results), and a "call to action," which allows the consumer to schedule an appointment or the business to provide a coupon. In 2014, that local advertising contributed $321 million of the company's $378 million in revenues. Two other sources of revenues, brand advertising and other services, allow companies to purchase general advertisements and conduct transactions. Both are growing rapidly, but they continue to be a smaller part of annual revenues. Using these revenue drivers as a guide, start your valuation by estimating the potential market, product by product.[3]

Size the market

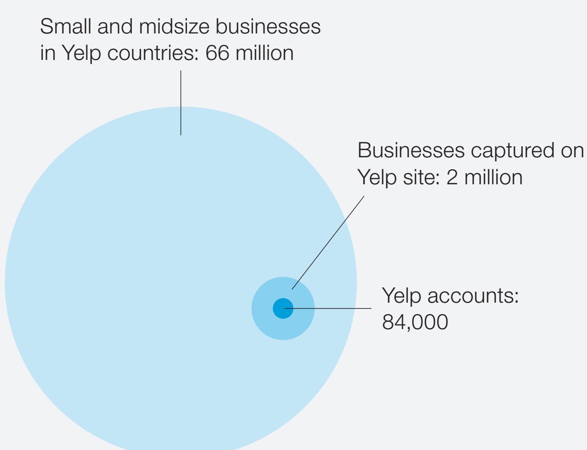
Although Yelp management rightfully touts its unique visitors and growing base of customer reviews, what really matters from a valuation perspective is its ability to convert local businesses into Yelp clients. Start with estimating how many local businesses are in Yelp's target markets, how many businesses will register with Yelp, and how many of those businesses will convert to its paid services. There are approximately 66 million small and midsize businesses in Yelp's target markets.[4] As of 2014, the company had registered 2 million businesses on its site. Of the businesses that registered, only 84,000 were paying clients. With 1 percent market penetration, there is plenty of room for growth (exhibit).

To build a revenue forecast, first estimate the number of business that might register with Yelp. We estimate both historical and future registration rates by analyzing Yelp's historical data. Since registration is free and Yelp is well known, we model penetration, for this exercise, to reach 60 percent. That translates to 8.5 million registered businesses by 2023. For most start-ups, forecasting a 60 percent share is extremely aggressive, since additional competition is likely to enter the market.[5] For this business, however, it is reasonable to assume that the largest company is

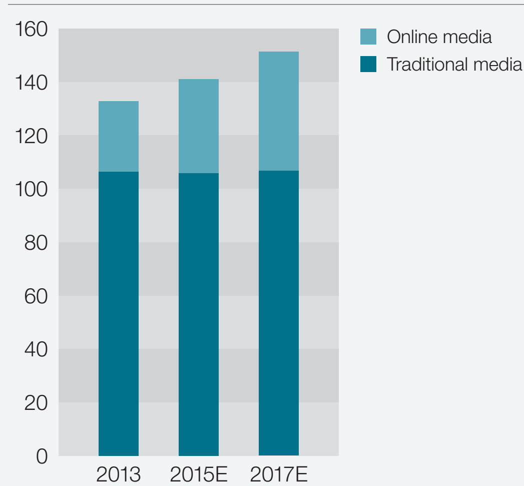
Exhibit

Yelp has potential to increase its market penetration.

Number of local businesses, 2013



US local-ad spending, $ billion



Source: BIA/Kelsey; Yelp 10-K, 2014; Yelp investor deck, Mar 2014 likely to capture a significant portion of the online market—since businesses desire an advertising partner that generates the most traffic, and consumers desire a website with the most reviews. In that way, this business is similar to others with a community of users that reinforces the use of the product, such as Microsoft's Windows operating system, which still retains more than 80 percent of its market.

With registered businesses in hand, next estimate the conversion rate from basic (free) to enhanced (pay) services. To estimate this number, we analyzed data from cohorts of Yelp's markets based on entry dates to annual conversion rates the company has reported. Based on historical data, we project that Yelp's penetration rate will grow from 4 to 5 percent as the cohorts mature. This number is quite conservative, but historical data have not pointed to much movement over time, even for Yelp's earliest markets.

Complete the forecast by estimating revenues per client. Again, data from early markets are relatively stable, averaging near $3,800 per business. Assuming average revenue per paying business increases at 3 percent per year leads to revenue of $5,070 per business by 2023. Multiplying the number of paying clients in 2023 (423,000) by the average revenue per business leads to estimated total local-advertising revenue of $2.2 billion in 2023. Adding estimates of revenues for brand advertising and other services yields an estimate of total 2023 revenues of $2.4 billion.

Next, we test our revenue estimate by examining potential market share in 2023. BIA/Kelsey, a research and advisory company that focuses on local advertising, estimated that local businesses spent $132.9 billion on advertising in 2013, of which $26.5 billion was placed online.[6] Between 2013 and 2017, the research company expects online advertising to grow by 14 percent per year, to $44.5 billion. Assuming that number grows by 5 percent per year, we estimated total online-advertising revenues will come to $60 billion in 2023. Although search engines such as Google are likely to continue to capture the lion's share of this market, there is still room for Yelp to capture a portion of local advertising. Our estimate for Yelp in this exercise translates to a potential market share of 4 percent by 2023.

Estimate operating margin, capital intensity, and return on invested capital

With a revenue forecast in hand, the next step is to forecast long-term operating margins, required capital investments, and return on invested capital (ROIC). Since Yelp's current margins as a fast-growing start-up are not indicative of its likely long-term margins, it is important to examine the fundamentals of its business model and look to companies with similar business models. OpenTable is another high-growth company actively serving businesses in local markets. OpenTable provides reservation services for restaurants. Similar to Yelp, the company generates revenue by deploying a dedicated sales team to local restaurants to encourage enrollment. OpenTable's management forecast that, when mature, it would reach operating profit margins of about 25 percent. Combined with our revenue forecast, this margin projection would translate to a potential growth in operating profit from a loss of $8.1 million in 2013 to a profit of $619 million in 2023.

But are these forecasts realistic? To address this question, examine other software companies that provide a similar conduit between consumers and businesses, funded by businesses. The key value drivers for Google, LinkedIn, and Monster Worldwide, though not a perfect comparison, offer some insight into what is possible.

If Yelp can match Google, perhaps 25 percent operating margins are not unrealistic. But not every business-to-business Internet company has been able to maintain such healthy margins. For instance, Monster Worldwide generated operating margins near 30 percent prior to 2010, but it has watched margins erode under competitive pressure. In 2013, domestic margins hovered near 15 percent, and the company's overall margin declined below 10 percent. Success with consumers by no means assures ongoing success with the businesses and, by extension, with financial results.

To estimate future cash flow, we also had to forecast capital requirements. Most businesses require significant capital to grow. This is not the case for many Internet companies. In 2014, Yelp required only $92 million of capital on $378 million of revenues, or 24 percent. Unlike traditional companies, which often consume significant capital as they grow, Internet companies require little fixed equipment; most of the capital resides in short-term assets such as accounts receivable. To create cash flow for Yelp, we maintained this percentage of invested capital to revenue, which is also in line with Google, LinkedIn, and Monster Worldwide. With high operating margins and little invested capital, ROIC is so high that it is no longer a useful measure. But what about the competition? If ROIC is so high, shouldn't competitors enter and eventually force prices down? Perhaps, but Yelp's real capital resides in intangibles such as brand and distribution capabilities, and these are not easily captured using today's financial statements.

Work backward to current performance

Having completed a forecast for total market size, market share, operating margin, and capital intensity, it is time to reconnect the long-term forecast to current performance. To do this, you have to assess the speed of transition from current performance to future long-term performance. Estimates must be consistent with economic principles and industry characteristics. For instance, from the perspective of operating margin, how long will fixed costs dominate variable costs, resulting in low margins? Concerning capital turnover, what scale is required before revenues rise faster than capital? As scale is reached, will competition drive down prices?

Often the questions outnumber the answers. To determine the speed of transition from current performance to target performance, we examined the historical progression for similar companies. Unfortunately, analyzing historical financial performance for high-growth companies is often misleading, because long-term investments for high-growth companies tend to be intangible. Under current accounting rules, these investments must be expensed. Therefore, accounting profits are likely to be understated relative to the true economic profits. With so little formal capital, many Internet companies have high ROIC figures as soon as they become profitable.

Consider Internet retailer Amazon. In 2003, the company had an accumulated deficit (the opposite of retained earnings) of $3.0 billion, even though revenues and gross profits (revenues minus direct costs) had grown steadily. How could this occur? Marketing- and technology-related expenses significantly outweighed gross profits. In the years between 1999 and 2003, Amazon expensed $742 million in marketing and $1.1 billion in technology development. In 1999, Amazon's marketing expense was 10 percent of revenue.

In contrast, Best Buy spends about 2 percent of revenue for advertising. One might argue that the eight-percentage-point differential is more appropriately classified as a brand-building activity, not a short-term revenue driver. Consequently, ROIC overstates the potential return on capital for new entrants because it ignores historically expensed investment.

Develop weighted scenarios

A simple and straightforward way to deal with uncertainty associated with high-growth companies is to use probability-weighted scenarios. Even developing just a few scenarios makes the critical assumptions and interactions more transparent than other modeling approaches, such as real options and Monte Carlo simulation.

To develop probability-weighted scenarios, estimate a future set of financials for a full range of outcomes, some optimistic and some pessimistic. For Yelp, we developed three potential scenarios for 2023. In our first scenario, revenues grow to $2.4 billion on roughly 423,000 converted accounts with margins that match Google's. In our second scenario, we assume that Yelp progresses much better than expected. Registrations for free accounts follow the base-case scenario, but the company doubles its conversion rate from 5 to 10 percent, leading to nearly a half million accounts and approximately $4.6 billion in revenue. In this scenario, the company continues its path to profitability, with margins comparable to Google's. This is an optimistic estimate based on past performance, but a 10 percent conversion rate is by no means implausible. The last scenario assumes that Yelp generates less than $1.2 billion in revenue by 2023 because the international expansion goes poorly. Without expected revenue growth, margins grow to just 14 percent, matching Monster Worldwide's domestic business.

To derive current equity value for Yelp, weight the intrinsic equity valuation from each scenario ($5.0 billion for the high case, $3.4 billion for the base case, and $1.3 billion for the low case) by its estimated likelihood of occurrence, and sum across the weighted scenarios. Based on our illustrative probability assessments of 10 percent, 60 percent, and 30 percent, respectively, for the three scenarios, we estimate Yelp's equity value at $2.9 billion and value per share at $39.[7] Whether this price is appropriate depends on your confidence in the forecasts and their respective probabilities. Were they too optimistic, too pessimistic, or just right?

Scenario probabilities are unobservable and highly subjective. If the probability of occurrence for the most pessimistic scenario were ten percentage points higher, Yelp's estimated value would be more than 10 percent lower. For start-up companies with promising ideas but no actual businesses, the sensitivities can be significantly higher. Take, for example, a start-up company that needs to invest $50.0 million to build a business that could be worth $1.2 billion with a probability of 5 percent and completely worthless otherwise. Its estimated value today would be $10.0 million. But if the probability of success were to fall by just half a percentage point, its value would decline by more than half. It should be no surprise that the share prices of start-up and high-growth companies are typically far

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more volatile when compared with companies with mature businesses.

As a result, understanding what drives the value of the underlying business across the scenarios is more important than trying to come up with a single-point valuation. A careful analysis of Yelp's business following the lines laid out above helps. For Yelp, the growth of the advertising market and the market share it could attain are important—but they can be forecasted within a reasonable range (and don't differ that much across scenarios). More critical—and harder to predict—are the conversion rates to paid-service accounts and the average revenues per account that Yelp realizes in coming years. Conversion rates and revenues per account are the key value drivers for Yelp. ■

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[1] Marc Goedhart, Tim Koller, and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, sixth edition, Hoboken, NJ: John Wiley & Sons, 2015.

[2] Although free reviews are commonplace today, this has not always been the case. As of this writing, professional reviewers such as the magazine *Consumer Reports* (for products) and Zagat (for restaurants) still charge for their service.

[3] For the purpose of exposition, this article examines only one source of revenues for Yelp in detail: local advertising, which generates the bulk of the company's revenues.

[4] Yelp investor presentation, 2014.

[5] One piece of data pointing to the potential of a 60 percent share is the restaurant-reservation company OpenTable. Before being acquired by Priceline.com in 2014, OpenTable reported that it had exceeded a 60 percent share in San Francisco.

[6] "BIA/Kelsey forecasts overall US local media ad revenues to reach $151.5B in 2017, lifted by faster growth in online/digital," November 19, 2013, biakelsey.com.

[7] During the first half of 2015, when this example was updated, Yelp's shares were trading between $40 and $50 per share. In the second half of the year, one of the cofounders announced his departure, and Yelp announced that growth would be slower than anticipated, leading to a substantial drop in the share price. As with any valuation of fast-growing companies, markets are volatile and susceptible to the mood of the market.

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