

Uncertainty:
The New Rules for Strategy

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Most growth opportunities share a common feature: uncertainty. In today's economy, strategic investments must be made without a pinpoint forecast of the future. At first this seems like a question of bad inputs – “just go find the data!” But it's not.

Managing in the face of uncertainty is different. It requires two important skills: the ability to identify valuable opportunities and the ability to adapt to marketplace changes. Managers often intuit a connection between strategic investments and value, even when there are no immediate cashflows. How many times have you ignored a quantitative analysis, justifying a project on “strategic grounds”? We need tools and methodologies that make this link visible. And, managers must be able to capitalize on good outcomes of uncertainty, they must be adaptive and flexible. Is there a project in your company that went exactly as planned? Or were the best projects one that adapted to changing conditions? We need a capability – timely information, decision making tools and organizational support – for guiding projects through uncertain environments.

Traditional valuation and strategic planning tools don't work very well in a world of uncertainty because they don't fully capture the options or opportunities

managers have to respond to unfolding events. We've written a book about a new approach, real options that "sees" these opportunities and values them, creating an integrated strategy and valuation framework.

The real options approach has its origins in finance, starting with the Nobel Prize winning work on valuing financial option contracts. Early on, academics saw how option pricing models could be applied to a variety of non-financial or real assets. And they saw that the real options approach could be a bridge between finance and strategy – after all both disciplines attempt to obtain the highest possible return on risky assets.

The real options approach has a host of immediate applications. We'd like to introduce some of the key ideas by thinking through a hot topic: the value of Internet companies. Then we'll give you examples from companies in three other industries and close with the new rules for strategy under uncertainty – insights we've developed from working with companies using the real options approach.

Valuing the New Growth Opportunities

Internet companies typify the current valuation dilemma, but the same issues are present in growth opportunities throughout high and low-tech industries. Why are we having such a hard time valuing Internet companies? Because the traditional valuation tools used by Wall Street are from another era – they are based on accounting systems for manufacturing companies in stable industries and are focused on current and near-term cashflow. The valuation problem for modern growth opportunities, Internet companies included, is hugely different: How do you value an immature, fast growing company in a young industry with rapidly changing

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boundaries and business models? Let's walk through how the real options approach can be used to answer this question.

The value of an Internet company depends on how it will deal with four key features of the Internet environment: enormous uncertainty; a competitive landscape paced by technology innovation; a need to rapidly adapt to changing conditions; and the costs of searching for a profitable business model. In the Internet world, today's successful strategy does not guarantee future profits; often the company must "morph" to the next thing. None of these features fit the traditional cashflow-based approach.

We've developed a two-phased approach to apply real options thinking to Internet company valuation. The first phase starts at the back. What is the mature company business model and what is its value? Wall Street's tools work fairly well for mature companies because they have a fixed and known strategy. But too often Wall Street's analysis also stops at the back, as analysts gloss over the challenge of the journey to the end game --neglecting what it takes to get there.

The second phase examines *the options* an Internet company must acquire and execute to get to the end game. We argue that most company investments in the volatile Internet world are options – business investments that create the opportunity to make decisions in the future, after events unfold. For example, a web site creates an option for further investment, that of building and testing an e-commerce connection to customers. A successful Internet companies recognizes that reaching maturity requires it to invest in a sequence of options. The final set of options leads to mature company status and cashflow. The next one back creates the opportunity to invest in the final set of options, the second one back creates the opportunity to invest and so on. Between now and maturity, the company's value is driven by it's ability to identify and execute the sequence of options.

As our sidebar shows, these options can be quantified. In fact, there is enormous rigor behind our approach, as strategic options can be valued using the arsenal of tools developed for financial options. Using the options approach allows company valuations to sensibly reflect the future, despite the lack of current or near-term cashflow.

We think Wall Street and retail investors have been trying to stretch cashflow-based approaches to valuation too far, neglecting to think through what it is required for an Internet company to reach maturity. It's going to take flexibility and further investments. It takes a willingness to adapt and ability to repeatedly raise capital. Not all companies will survive, and today's valuations should be discounted to reflect the true odds. Right now, many investors are relying on cashflow-based models to benchmark value (which can't work), and valuations are ranging widely. The better-anchored options-based approach narrows the range of reasonable valuations.

Valuing an Internet company presents many of the same issues as valuing corporate growth opportunities, particularly in how strategy and valuation are intertwined. The real options approach helps to identify the most valuable strategies for a world of uncertainty.

The New Strategies in Action

Let's look at three applications of the real options approach to valuation and strategy. These applications span a wide range and illustrate how the real options approach integrates a variety of issues into a single strategic valuation framework.

Our first application is investments in information technology (IT). For most companies, IT investment is no longer a side issue but one central corporate strategy

in fast-moving markets. For example, suppose the chief information officer must decide between a server that fits today's needs plus reasonable growth or premium-priced server that will accommodate ultra-fast growth. Is the greater expense justified when ultra-fast growth may or may not happen? The real options approach recognizes that the premium-priced server creates an option for ultra-fast growth, and helps the strategist link server features to the value and likelihood of strategic objectives. The server should be purchased only if the value of the option it creates exceeds the price premium.

Our second application is oil exploration. Consider the case of seismic exploration, in which sound waves are used to improve the estimate of how much oil is in the ground. An exploration investment will narrow the range of uncertainty. So the key question for the petroleum engineer is whether the value of the improved information exceeds the exploration cost. At some point, there is no point in spending to reduce uncertainty and the reserve is either developed or abandoned. The real options approach integrates the geological uncertainty with oil price uncertainty so that exploration decisions are in line with valuations in the oil markets.

The third application is intellectual property. For an increasing number of companies, an important source of revenue comes from licensing and selling intellectual property. The terms and conditions on these licenses can be complex, including payments for performance, royalties, limitations on use and so on. For example, one company may offer to reduce the upfront fee required from \$4 million to \$2 million if the royalty rate is increased from 1% to 2% with a floor of 50 cents per unit. The real options approach can be used to quantify the value of the two proposals, including the floor. Traditional valuation tools cannot correctly value floors and caps, so only the real options approach can keep all the alternatives on an "apples to apples" basis.

The New Rules

Many strategists are facing the kinds of issues we've been discussing. In a fast-moving world of uncertainty, managers must be ready to respond. Here is a starting point, 10 rules for finding the options in your strategic investments.

1/ Make no assumptions: What is your market?

Technology and deregulation are rapidly blurring conventional industry definitions. Rethink your market boundaries and competitors through today's customer-centric lens. Include sources of uncertainty and how industry players will respond.

2/ You already have some answers: Use the insights from durable economics

A good part of the New Economy can be well understood using durable economic principles – concepts and frameworks that are well known to economists, but often skipped over in Econ101. Carl Shapiro and Hal Varian have written in a book that deftly makes this point. As the authors state “Technology changes. Economic laws do not.”²

3/ Identify your options

Greater uncertainty creates the need for greater flexibility. Where are the options for future flexibility in your current projects? For example, your plant expansion comes with an option to wait – you can start it now or later. Your plant that is currently running has an option to shutdown. (Remember – the option to shutdown will have some value even when it is not likely to be used!) Because traditional quantitative analyses ignore these options, you can add their value to a discounted cash flow result.

4/ Nurture your options

Nothing is free, including the options you just identified. What will it take to keep these alive as viable investment opportunities? And sometimes, the value of the option is not worth the its cost. For example, continuing an R&D project creates the option to turn it into a commercial product. You don't know if you will, but you might. In some cases, the promise (value of the business opportunity and likelihood you'll continue) makes the option to continue valuable, in other cases you are better off canceling the project. And we've got some bad news: Traditional tools, such as discounted cash flow, completely miss the value of risky, long-term projects such as R&D. There's no easy fix, but because the standard approach always undervalues R&D-type activities, your company may be under-investing in new products.

5/ Get ready for flexibility

Can you really cancel a project in your company? Can you make this decision objectively? Can you make it in time to limit losses? Flexibility cuts both ways – it captures upside potential and saves you from sinkholes. But only if you are ready to act. Often we hear corporate staff essentially saying: "I see the option, and the course of action, but my boss is such a lunkhead; she's paralyzed." The ideas we've presented will remain rather academic if your organization is not ready. As you identify an option, you can help to realize its value by identifying the right decisionmakers, giving them the appropriate incentives and making sure they get the right information.

6/ It's not your choice: the pace of decisionmaking

² Carl Shapiro and Hal Varian, Information Rules, HBS Press, 1998

How often does your company review its strategic projects? What prompts a decision to be made? To capture the value of opportunities to respond to unfolding events, the pace of decisionmaking and project review must be in step with external events. In the food processing, it may be necessary to review use of the temporary shutdown option on a seasonal basis. In the movie industry, distribution and advertising strategies are reviewed each week, based on the weekend's box office receipts. Now that the auto industry is building significant electronic features into our cars and meeting customers over the Internet, will their pace of decisionmaking also need to change? Annual and quarterly strategic planning reviews have their place, but they cannot drive decisionmaking without giving up substantial value from the timing component of many corporate options.

7/ Create options

On the first pass of an investment review, you can add significant value over conventional valuation approaches by identifying the options. On the second pass, you can get a similar step up in value by creating options. For example, create the option to change course, re-focus or even abandon midway through a project. One New Economy firm, Viant, has taken this concept a step further. They break down their e-commerce/ e-company implementation projects for clients into 90-day modules. This reduces the implementation risk, but more importantly, Viant is creating valuable options for their clients. The 90-day module creates a focus on learning from what has been done and on responding to market and technology events -- and the option to make new decisions. Viant wins because it's easier to sell the more valuable, flexible process. The customer wins because they're getting a more valuable project, one that includes options. And of course Viant needs to communicate that options are valuable, even when not used. (Including the option to drop Viant or the project!)

8/ Too many options, too few resources: You can't do it all

Options change the meaning of focus. Identifying, nurturing, and creating options takes substantial time and energy. Meanwhile your industry pace is picking up, technology is becoming more complex and it's hard to hire the key people in your core business area. Regis McKenna said it 1985, and it's still true today: "As technologies advance and become intertwined with one another, no single company has the full range of skills and expertise to bring products to market in a timely and cost-effective way."³ Hence you need to focus on your core capabilities, and all the associated options, partnering for the rest. Have you noticed that even Microsoft doesn't do it all?

9/ Contracting transparency: Discipline is here

Everybody's contracting. Electric power companies now meet demand by generating power or contracting for power. Telecom minutes and bandwidth is now bought and sold on four different exchanges. Biotech companies routinely develop products with the intended strategy of licensing marketing rights to a large pharmaceutical company. Other biotechs, such as The Medicines Company, acquire drugs in late-stage development through a license and then complete the product. (Actually, they don't even complete the product themselves, they partner – through contracts – with other companies.)

There are two critical points of discipline in these contracts. First, physical and contractual assets must line up. Electric power generation assets, for example, are no more valuable than the contracts written on them. And contracts for power can't be at prices higher than self-generation. Second, contracts and licenses written by publicly traded companies are transparent. When Silicon Graphics took its MIPs

division public, one financial market analyst commented: “MIPs is going to live and die by its licenses.” Wall Street is watching the pricing and terms of MIPs licenses, and capitalizing the information into their stock price. As the markets continue their work to pull these forces together, it is not unreasonable to expect a publicly traded company to have contracts disciplined by other pricing of risk and return in the markets and by the alternatives provided by its own physical assets.

10/ New Economy or Dow: You've got to ask the right questions

New Economy firms wrestle with the Internet, the e-company, digital plumbing, and intellectual property. And these issues threaten the business models of most smokestack industries as well. From Hallmark to Fed Ex to General Motors, technology is starting to set off a tidal wave of change. To make sense out of this enormous and broadbased phenomena, we need a new frame of reference, a new way of thinking. And we need to collect new and different kinds of information. We've got to start asking the right questions: What are the drivers of uncertainty? What's its magnitude? Where are the decision points? What are opportunities to increase upside potential? What are the opportunities to limit losses? At what cost? What will it take to remain flexible? When is it worth it? Can we get our flexibility and options more cheaply through contracts? And so on.

With standard approaches and tools, its going to feel like you're on a lifeboat in a sea of chaos. Change your thinking. See how to create value out of uncertainty, and how to remain a nimble competitor – always afloat – as the waves of change roll through.

A Real Options Application:

³ The Regis Touch, page. 68

The Strategy and Valuation of a New Venture

To make the real options approach concrete, let's walk through an example. We'll lay out the flow of calculations here and present the results. If you would like to see more detail, download the spreadsheet at www.real-options.com/jbs.html

Portlandia Ale is two guys and a dream. The company needs \$4 million to begin product development and manufacturing and another \$12 million in two years for its market launch. The entrepreneurs are very optimistic about their business opportunity, despite considerable uncertainty about the value of the market opportunity they're chasing.

[Figure 1 about here]

Portlandia is showing potential investors a traditional business plan. \$500,000 would be spent each quarter for the first two years. Then \$12 million would be spent in the first quarter of the third year to launch the product line. The business plan assumes the launch would be successful, leading to a sustainable business with a market value of \$22 million. (The value of the sustainable business is calculated as: $M/S \times \text{Portlandia's sales}$, where M/S is the average market value to sales ratio for mature microbrewery companies.)

Even under two optimistic assumptions – business conditions will support the sales forecast in the plan; and the launch will be made – the value of Portlandia under the traditional business plan is *negative* \$230,000.

The business plan fails to include the valuable option held by the startup: Portlandia need not undertake the market launch. The launch will only be made if business conditions are strong enough to make the launch profitable. Portlandia's strategy is more complex and its valuation is higher than is recognized by a traditional business plan.

The Black-Scholes equation is a well-known formula for pricing financial option contracts and can also be used to value Portlandia's launch option. The formula – for which Myron Scholes and Robert Merton won the 1997 Nobel Economics Prize – requires only five inputs to produce a single output, the current value of the option. (A note of caution: not all real options can be valued so easily. Many corporate options are more complex and require tailored mathematical formulae. (See the website for the Black-Scholes calculations for this example and for more information on other methods.)

The current value of Portlandia's option to launch is \$4.96 million. It's value comes from the upside potential. If two years from now business conditions are terrific, then there will be a very high payoff to the \$12 million launch cost. If two years from now business conditions are poor, the product will not be launched and the \$12 million will not be needed. Portlandia now has a *contingent strategy*, one that depends on business conditions. Before the launch decision date, Portlandia's total product development cost will be \$3.83 million in present value terms. The value of Portlandia with the launch option is \$1.13 million (\$4.96 million – \$3.83 million.)

Now let's more realistically characterize Portlandia's strategy by adding a second option: the option to abandon. Suppose that at any time during the first two years Portlandia could cease operations if business conditions soured to such a level that Portlandia could not see making the launch. The calculations are now a bit more complex, and require specialized mathematical tools known as numerical methods -- tools widely used in engineering, science and on Wall Street.

The option to launch and the option to abandon are valued in an integrated manner, resulting in a \$1.74 million valuation for Portlandia. The traditional business plan undervalues Portlandia because it fails to recognize that the company will be using a contingent strategy, one that responds to unfolding conditions.

This brief example illustrates a numerical implementation of the real options approach and demonstrates how traditional tools severely undervalue investments with options. The magnitude of increase given here, from -\$0.23 million in a traditional business plan to \$1.74 million for valuation that includes the key options, is fairly typical of strategic growth opportunities.