

Calculating value during uncertainty: Getting real with “real options”

Traditional valuation techniques often fail to capture or adequately quantify the value created by technology initiatives. Is there an alternative technique that identifies value that would otherwise be left on the table?



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Real options

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A powerful alternative to DCF and ROI

Anyone who has tried to measure the value of a technology investment has, at some point, discovered the difficulty of presenting a compelling business case using standard techniques like net present value (NPV) or return on investment (ROI). Projected cash flows seem meager in comparison to the investment required, or the discount rate chosen to compensate for the risk is so high that it renders the NPV unpalatable. Analysts often resort to instinctive appeals of “synergy,” “table stakes” or “strategic importance” to compensate for the valuation shortfall. Indeed, many executives intuitively know that technology initiatives have some sort of value that discounted cash flow analysis (DCF) fails to capture. Yet, even in today’s difficult environment, executives continue to invest in technology and other initiatives that fail to show a positive NPV. Is there a way to identify and calculate this missing value? *Real options* present one such alternative.

The root of the problem is that static valuation methods tend to undervalue investments made under uncertainty. For several years, the oil and gas industry and pharmaceutical companies – businesses characterized by large capital investments with extremely volatile payoffs – have been using real options to help them quantify the risks and potential rewards associated with making investments in risky environments.

These characteristics also describe many initiatives being contemplated today. Economic and business conditions are volatile, outcomes are extremely uncertain, investments are high and the risk of losing everything is real. Yet, the upside potential can be huge. Real options recognize that today’s investments give investors the choice of pursuing further investments later, if conditions appear favorable, or abandoning the project if the environment has deteriorated. The capital investment made today provides future flexibility that *can* and *must* be valued, but is often missed by traditional DCF or ROI measures. Borrowing from both finance and strategy, real options can provide a way to analyze the value of investing in initiatives made under uncertainty.

This executive brief can offer only an overview of a very comprehensive subject, entire books have been written about it. However, it provides an introduction to the use of real options and how they can benefit companies today.

Real options

Real options are analogous to financial options

The theory of real options borrows heavily from the financial world. A *call option* gives the buyer the right, but not the obligation, to buy a security at a specified price in the future. The buyer of the call option is taking an optimistic view of the security underlying the call option. Similarly, a capital investment today that gives the investor the future right, but not the obligation, to make a further investment is a real option. A variety of factors can influence the value of the option. For example, as the value of the stock (or the present value of the expected cash flows) increases, so does the value of the call option. In fact, real options are directly analogous to financial options in several ways, as shown in Figure 1.

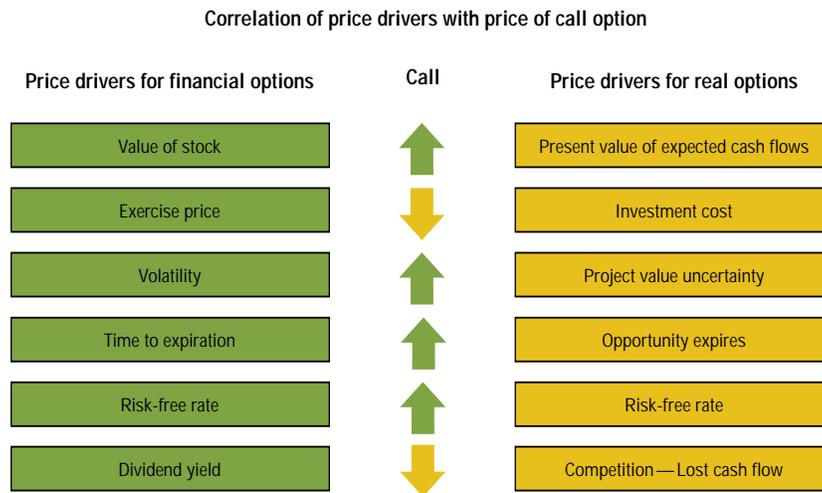


Figure 1. The fundamentals of financial options and real options.

Source: IBM Institute for Business Value Analysis.

Real options

Types of real options

There are two types of real options:

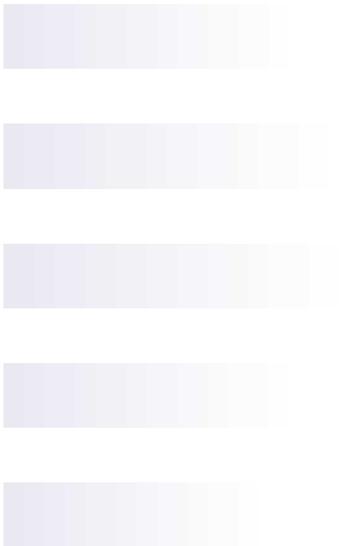
- Growth options
- Flexibility options.

Growth options give a firm the ability to increase its future business. Examples include research and development, brand development, mergers and acquisitions, leasing or developing land, or – most pertinent – launching a technology initiative.

Flexibility options, on the other hand, give a company the ability to change its plans in the future. Management can purchase the option to delay, expand, contract, switch uses, outsource or abandon projects.

Traditional versus real options

Certain critical components of real options make them a powerful analytical tool. First, they recognize and value the flexibility that today's capital investments provide. Second, they recognize the staged nature of many investments and account explicitly for the reality that certain of these investments will never be made if – based on additional information developed over time – they are deemed unattractive. In this instance, it makes sense simply to abandon them, rather than sink additional monies into a poor investment.



Real options

In contrast, DCF looks at a series of investments as if they will be made, *regardless* of whether or not they still make sense at a later date. For example, Figure 2 depicts a property and casualty insurance company launching a new distribution channel. In this scenario, it is assumed that the initiative will be launched nationally and that it is a yes or no decision. There is a 50 percent chance of success because of uncertainty relating to market acceptance and the potential backlash from agents.

There is a 50 percent chance of success for this new distribution channel

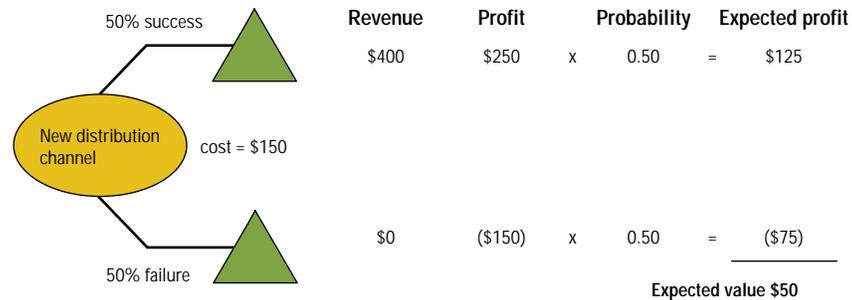


Figure 2. Static valuation technique.

Source: IBM Institute for Business Value Analysis.

Contrast that information with Figure 3, which – although depicting the same hypothetical insurance company – differs in that the analysis captures the value created by management’s ability to *stage* the initiative. Assume that in this case, the insurance firm will first launch a pilot program for its new distribution channel in a small geographic market. Based on the results of the pilot program, the company can decide whether to launch a national campaign or abandon the project. This analysis quantifies the value created by staging an investment. The firm can gain market data before a national launch or abandon a project before spending additional funds.

Real options

Of course, an actual example would factor in additional variables, such as the time value of money. In this simplified example, the incremental value of the option would be US\$33.

There is a 50 percent chance of success, but the analysis captures the value inherent in staging the investment

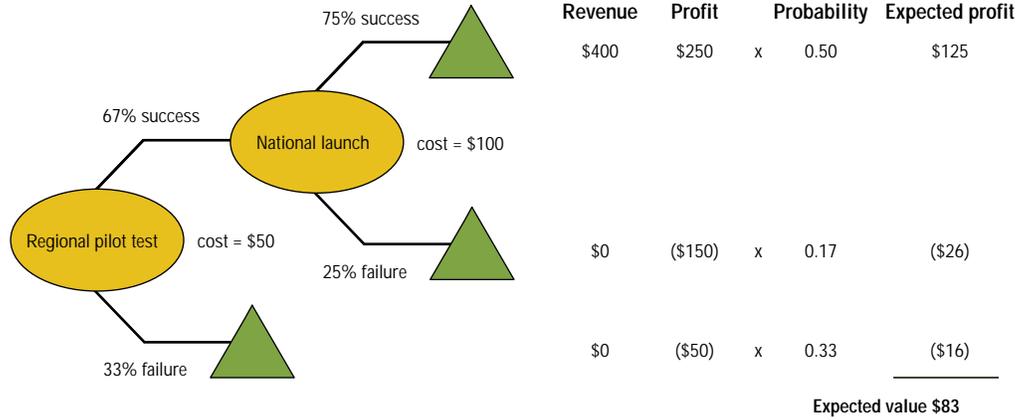
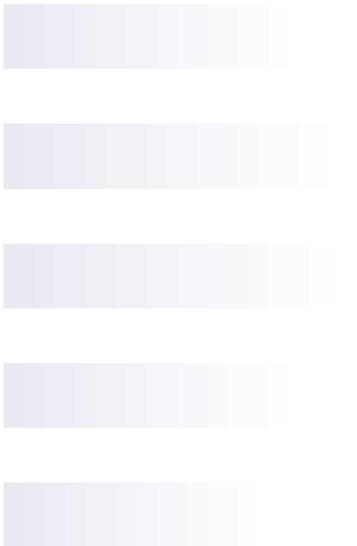


Figure 3. Valuation that captures the option to delay an investment.
Source: IBM Institute for Business Value Analysis.

Additionally, real options compensate for the uncertainty inherent in investments by *risk-adjusting cash flows and discounting them at a risk-free rate*. Discounted cash flow (DCF), on the other hand, compensates for this uncertainty by *adjusting the discount rate*. Adjusting cash flows forces analysts to be more explicit about assumptions underlying the projections and eliminates interminable discussions about the appropriateness of one discount rate versus another.



Real options

Another critical difference between DCF and real options is the effect of uncertainty (or risk) on value. Uncertainty typically is considered bad for the valuation of traditional cash flows. In contrast, uncertainty *increases* the value of real options. So, in today's uncertain environment, the value of options actually increases. How does this happen?

Consider two examples: After an investment is made, time passes, uncertainty is resolved and the present value of cash flows (analogous to the future value of a stock) can be calculated more accurately. If the environment is volatile, the chance that the value of the project in the future will exceed the investment required (or, in other words, that the NPV will be positive) increases. Figure 4 shows two investments; one with a wide range of possible outcomes, the other with a relatively narrow range. In the former, more volatile scenario, there is a good chance of producing a project with a positive NPV in the future. Hence, a real option under this set of outcomes would have value. The latter, more stable scenario has no chance of producing a project with a positive NPV. An option using the latter set of outcomes would have no value.

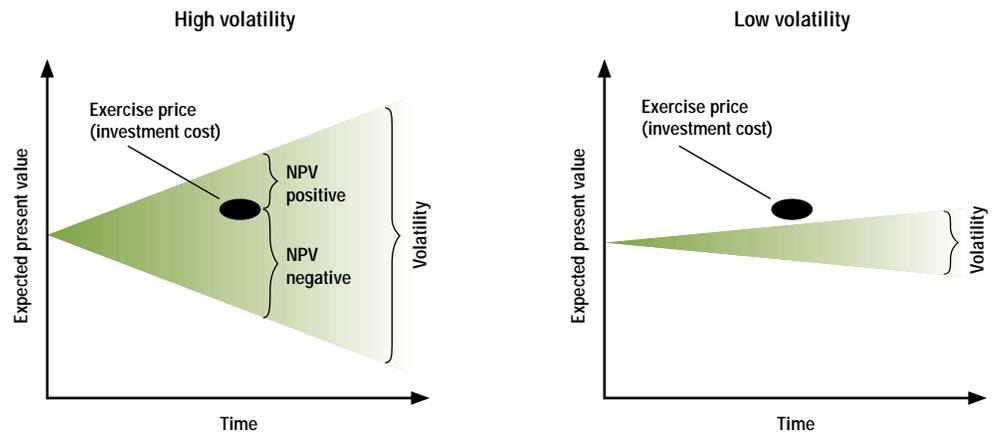


Figure 4. Volatility increases the value of real options.

Source: IBM Institute for Business Value Analysis.

Implications: Real options not yet in the mainstream

Real options are not universally recognized as a means of valuing capital investments. Yet, the now ubiquitous capital asset pricing model did not become a common pricing model overnight, either. Executives involved with assessing technology initiatives should think, at least conceptually, about the advantages provided by real options.

Although addressing the mechanics of calculating an actual value for a real option are beyond the scope of this brief, there are several key lessons:

- As volatility (uncertainty) increases, so does the value of the real option.
- Initiatives with great uncertainty should be implemented in stages. Making a small investment up front can give management the ability to resolve uncertainty through data gathering and learning. The larger investment in the future can be made in an environment with less uncertainty.
- A series of initiatives should be looked at on a portfolio basis. The overall results of the portfolio of investments are what ultimately matter, not the individual performance of each initiative.
- Real options recognize that abandonment is a viable alternative that must be contemplated from the outset. Dropping a project does not necessarily mean that the team in charge of the particular initiative has failed.
- Technology investments might often grant the possibility of pursuing an avenue in several months or a couple of years. Without the relatively small investment, the opportunity might be foreclosed forever.
- Although real options can be intuitively appealing, the execution of arriving at a value is difficult. Determining the exact value of a real option is not necessarily critical. Instead, understanding the drivers of the valuation and the value relative to traditional methods is much more important.

Conclusion

If real options are such a useful tool, why haven't they been widely adopted? Any new theory takes time to percolate through organizations that are used to doing things a certain way (changing a hurdle rate, for example, is often a major challenge). In addition, real options are difficult to explain in a few sentences – it's a daunting task to communicate them effectively. And finally, arriving at an accurate valuation is somewhat complicated and time consuming. But ultimately, real options can provide an extremely useful method of unlocking the value embedded in investments that many practitioners know exists, but have been unable to quantify.

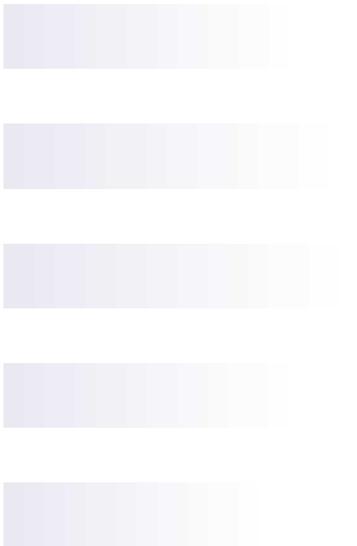
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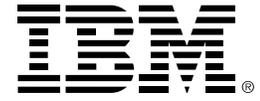
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