

Economics of Software as a Service

*John R. Grabski

A Problem for SaaS Providers

Academics, investors and business professionals throughout the world agree that SaaS inherently provides a host of economic benefits to the customer. However, recent studies show that the vast majority of finance professionals will use a valuation technique that may *fail* to capture those same benefits¹. While SaaS providers have enjoyed much success in recent years, this should be a concern for those that compete against traditional license based models for the true value of the SaaS application may go unrecognized.

Most Popular Valuation Method

For more than forty years, the discounted cash flows method has been the capital budgeting technique of choice². First developed in 1938 by J.B Williams and popularized in the context of corporate finance by Myron Gordon in 1962, the DCF method of valuation has remained the single most popular valuation technique among finance professionals for the past four decades³. Indeed, it has been said that the DCF method of valuation has been the “backbone of modern corporate finance”⁴. And while the DCF method is not without limitations, few could argue the significant role that it has played in the evolution of corporate finance.

While the math underpinning the DCF model is sound, the technique works best when the investment environment is stable, risk is measurable, and cash flows are realized at one moment in time for each period. Unfortunately, such investments are rare. Moreover, most investment opportunities are more complex and often contain economic benefits contingent upon the occurrence of specific events or conditions. In such cases, conventional DCF methods ignore the economic value, or lack thereof that follows.

Weaknesses of DCF

Conventional DCF models assume that economic benefits associated with the investment will occur with certainty. In the conventional model, both the time value of money and the risk associated with the expected cash flows are bundled into one composite discount rate that is used to express the value of future cash flows in present day terms. In order to perform with complete accuracy, such a measure requires near perfect knowledge about all future states of the world⁵.

This assumption creates several problems for SaaS providers. First, it overlooks the fact that most investment opportunities are *uncertain* as opposed to certain. For instance, when purchasing a new CRM application, the buyer cannot possibly know the future ROI of the investment with complete certainty. Indeed, he or she may come to learn that the investment may fail to generate a positive ROI at all. In such a scenario the SaaS subscription provides the buyer with a way out. This escape route is valuable and especially so when compared to conventional license based models that trap the decision maker with irreversible sunk costs.

Economics of SaaS are Different

Unlike the traditional license based model, SaaS inherently provides the buyer with the flexibility to *change* the course of the investment as uncertainty is resolved. In other words, the SaaS customer may unsubscribe, walk away, and avoid future economic loss if the application fails to perform as expected in contrast to the license based models where costs are sunk and usually irreversible. These and other economic benefits provided by SaaS require a different approach to valuation.

Implications

When customers ignore the value of managerial flexibility, it creates a significant set of problems for SaaS providers. Oftentimes, the license-based model appears more cost effective at first glance. Without considering the cost of capital or discount rate, the buyer may consider the traditional model more cost effective since out of pocket expenses *over the period* may be less. For example, a traditional license-based CPM application that costs \$100,000 compared to the SaaS subscription of \$28,000 paid over five years favors the traditional model with an out-of-pocket price tag that is \$40,000 lower after five years. However what if the application fails to deliver as expected? The SaaS customer may unsubscribe after the first year risking only \$28,000 while remaining free to invest the difference of \$72,000. Meanwhile the traditional customer is faced with the loss of the full value.

What is the Option Worth?

As the owner of a taxi service, suppose that you have the opportunity to purchase two identical taxi-cabs on credit. Both cars will produce the same operating revenue however one model comes with a full guaranty that will forgive all remaining debt payments should the car suffer a crash. How much more would you be willing to pay for the car with the guaranty?

The question is not an easy one to answer. The option to avoid future debt obligations should the car crash is clearly valuable. Similarly, the option to avoid future obligations on a CPM or CRM application that *crashes* is also valuable.

* Author is the CEO of ClearMomentum, Inc., a financial analytics and corporate performance management software company, founder of five successful technology companies and holds an executive OPM from Harvard Business School and an MBA in Finance and Accounting with the honor of distinction from the University of Liverpool.

No Number – No Action

While buyers of SaaS products and services intuitively recognize the value of flexibility delivered by SaaS, failure to translate that same value into dollars and cents makes it difficult to compare one alternative against the other. Unless the SaaS provider can justify the value of flexibility in the form of a concrete number, the value may go unrecognized, leading to lost sales, profit erosion or the loss of negotiating leverage.

The issue at hand is that DCF valuation techniques do not capture the value of managerial flexibility that SaaS brings to the table. The larger issue is that 87% p<.001 of finance professionals indicate that this is precisely the technique they intend to use when making purchasing decisions that involve SaaS⁶.

87%

Represents the percentage of finance professionals that intend to use conventional DCF methods to value SaaS products and services.

The vast majority of finance professionals will utilize a valuation technique that ignores the value of one of the most valuable SaaS attributes, the option to unsubscribe.

Addressing the Problem

A *Real-Options* approach to valuation represents one solution that overcomes many shortfalls of the conventional DCF model. In contrast to financial options which convey the right but not the obligation to acquire a security that is based upon the underlying value of the stock price, a *real-option* provides the right to invest or not invest in a specific asset or economic opportunity⁷.

The adoption of Real-Options as a valuation tool in the corporate setting has grown in popularity in recent years however research has shown that the evolution and adoption of new financial techniques to be a slow process. If valuation techniques continue to evolve as a function of technology and higher education as many researchers suggest, then it is just a matter of time before OPMs become more popular. Meanwhile, it is perhaps doubly important for SaaS providers to realize that the full value of their products or services may go unrecognized if they are subject to DCF valuations alone.

Fortunately, much can be done to make customers aware of the value of flexibility inherent in the SaaS environment. Raising awareness through case studies that illustrate the economic impact of the option value versus the conventional license based DCF model is one step to help bring option value into the picture. While a case study may not make the sale, it should make it clear that recognizing the option value as part of the analysis makes good sense.

Quantifying the option value to unsubscribe is critical if it is to be taken seriously. Developing a cost-benefit-analysis that demonstrates and compares the expected economic benefits provided by the application represents an excellent opportunity to illustrate not only the option value but it justifies the overall investment as well. Such a model is easily developed when the expected increase in cash flows generated by the SaaS application are quantifiable.

Raising awareness

- Case study SaaS option value
- Quantify the value to unsubscribe
- CBA that includes option value

Creating Competitive Advantage



- 1 Incorporate case studies into the sales & marketing strategy that illustrate the cost benefits of flexibility provided by SaaS.
- 2 Develop cost benefit models that can be used in the proposal process that demonstrate option value.
- 3 Quantify the value of flexibility for negotiating leverage.
- 4 Encourage customers to recognize the value of managerial flexibility.

There may be little that the SaaS provider can do to change the customer's preferred method of valuation. However, with the help of a model that includes option pricing, the company's sales approach can be expanded to articulate the value of flexibility and explain that same value with some degree of confidence. Taking this approach, the company might encourage the customer to recognize the value of flexibility in the SaaS environment when compared to a license based model that requires an investment representing sunk costs.

Choosing OPMs

Several methodologies exist to value *real options*. Perhaps the most straightforward is the binomial lattice option pricing model that follows a basic decision tree format, illustrating all possible investment outcomes. The lattice depicts the expected value of the investment along different nodes or points in the tree according to probability⁸. Table I illustrates a list of several popular Option Pricing Models that can be used to value the option to abandon.

Table 1

Valuation Technique	Pros	Cons	Comments
Conventional DCF	<ul style="list-style-type: none"> • Simple NPV Analysis 	<ul style="list-style-type: none"> • Rigid • Assumes Certainty • Does not recognize option value. 	<ul style="list-style-type: none"> • Conventional DCF analysis works fine if the environment is certain
Binomial Lattice OPM	<ul style="list-style-type: none"> • Extremely Flexible 	<ul style="list-style-type: none"> • May require high number of inputs 	<ul style="list-style-type: none"> • Reveals value including the option to abandon
Modified Black Scholes OPM	<ul style="list-style-type: none"> • Easy to use • Low number of input values required 	<ul style="list-style-type: none"> • Limitations due to unobservable market volatility and other factors 	<ul style="list-style-type: none"> • Recent progress made by Williams & Sutherland to address limitations may make MBS a good choice
Reversible DCF OPM	<ul style="list-style-type: none"> • Simple adjusted NPV Analysis 	<ul style="list-style-type: none"> • Must estimate probability 	<ul style="list-style-type: none"> • Model essentially adjusted cash flows with a certainty equivalent coefficient and reverses negative NPVs. Returns a value similar to a binomial put option.

Recent progress established and put forth by Williams and Sutherland (2006) may make the modified Black Scholes methodology much more attractive in the real-options setting from a practical perspective. For example, the authors introduce a convex or concave scaler that can be used to modify Black Scholes call option pricing in a manner that reflects cash flows more in line with economic reality. For example, the scaling factor will render the option worthless if the lapsed period exceeds the project's life cycle while optimizing the value during the period that represents peak return.

While each of the models presented in Table 1 come with limitations, noted authorities including Trigeorgis (1996), Damodaran (2001), Williams and Sutherland (2006) and Benninga (2000) and others agree that option pricing models are almost always more appropriate than traditional DCF models when uncertainty and managerial flexibility is present in the investment opportunity. This is especially important for those engaged on both sides of the SaaS transaction.

Footnotes

- 1 Research conducted by Grabski (2008) that concluded that in excess of 87% p-.001 of 542 finance professionals employed by companies ranging from \$100 Million to \$1 Billion Dollars annual revenue will use DCF to value SaaS investments.
- 2 Siegel (1985), Higgins (1998) and Benninga (2000) make reference to the view that the DCF methodology is the most popular capital budgeting technique of the past four decades.
- 3 The evolution of DCF according to Siegel (1985).
- 4 Statement DCF the backbone of modern finance made by Higgins (1998).
- 5 Simon (1957) makes it clear that human beings cannot have perfect knowledge about all future states of the world.
- 6 University of Liverpool research conducted by Grabski (2008) that concluded that in excess of 87% p-.001 of 542 finance professionals employed by companies ranging from \$100 Million to \$1 Billion Dollars annual revenue will use DCF to value SaaS investments.
- 7 See Damodaran (2001) and Trigeorgis (1996)
- 8 See Damodaran (2001) and Trigeorgis (1996)

Reference List

- Benninga, S. (2000) *Financial Modeling* 2nd Edition Cambridge: MIT Press
- Damodaran, A. (2001) 'The Promise and Perils of Real Options' Stern School of Business, New York Research Paper
- Grabski (2007) 'Valuation Techniques and the Economics of SaaS' Revised Edition "*Do option pricing models outperform conventional DCF valuation techniques for capital budgeting decisions that involve SaaS? Which of the two models is most likely to be used going forward?*" University of Liverpool pp.1-102
- Higgins, R.C. (1998) *Analysis for Financial Management* 5th Ed. Boston. McGraw-Hill
- Siegel, J.J. (1985) 'The Application of DCF Methodology for Determining the Cost of Equity Capital' *Journal of Financial Management* Spring Edition pp.46-53
- Simon, H. (1957) *Administrative Behavior: A Study of Decision-making Effectiveness* New York City Macmillan.
- Trigeorgis, L. (1996) *Real Options* Cambridge: MIT Press
- Williams, J.R. and Sutherland, A.G. (2006) 'Option Pricing of Dynamic Strategies' *Working Paper* Tepper School of Business at Carnegie Mellon Pittsburgh, PA