

Entrepreneurial Financing



New Venture Strategy and Real Options

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Lecture 4

ENT 632
Entrepreneurial Financing



- a) Explaining strategic decisions and comprehensive strategic planning, the entrepreneur can use for identifying the alternative that yields the highest expected value.
- b) Identifying how a new venture can be thought of as a portfolio of real options.
- c) What is Strategic planning in the context of Entrepreneurial financing.
- d) Comparison between real options and financial options.
- e) Differences between Decision tree analysis and Game tree analysis.

Introduction

New Venture Strategy and Real Options

- You may wonder why, in a book on entrepreneurial finance, we would devote this chapter to strategic planning. **There are three key reasons.**
- **First**, strategic planning is about choosing a course of action that is designed to achieve a particular objective. In business settings, the overarching objective is financial return. Even in not-for-profit settings where the primary objective may be philanthropic, adequacy of financial return must be an intermediate goal.
- **Second**, almost any strategic plan affords opportunities to change path after the initial direction has been selected. In financial terms, these choices are described as real options. Finance provides a means of valuing real options and taking account of those values in the initial strategic choice.
- **Third**, for new ventures, ability even to pursue a particular strategy can depend on whether financing can be found.
- This chapter establishes the basics of strategic planning in an entrepreneurial setting and develops a framework for evaluating alternative strategies.
- **The framework describes real options as decision trees and uses investment valuation to evaluate alternative strategies.** The framework begins with identifying the objective and the strategic alternatives for achieving it.
- In general, we assume that the objective is maximum NPV for the entrepreneur.
- The alternatives are structures of real options that can be described and evaluated as the branches of a decision tree.
- We begin by highlighting the interconnected nature of product market, financial, and organizational choices.

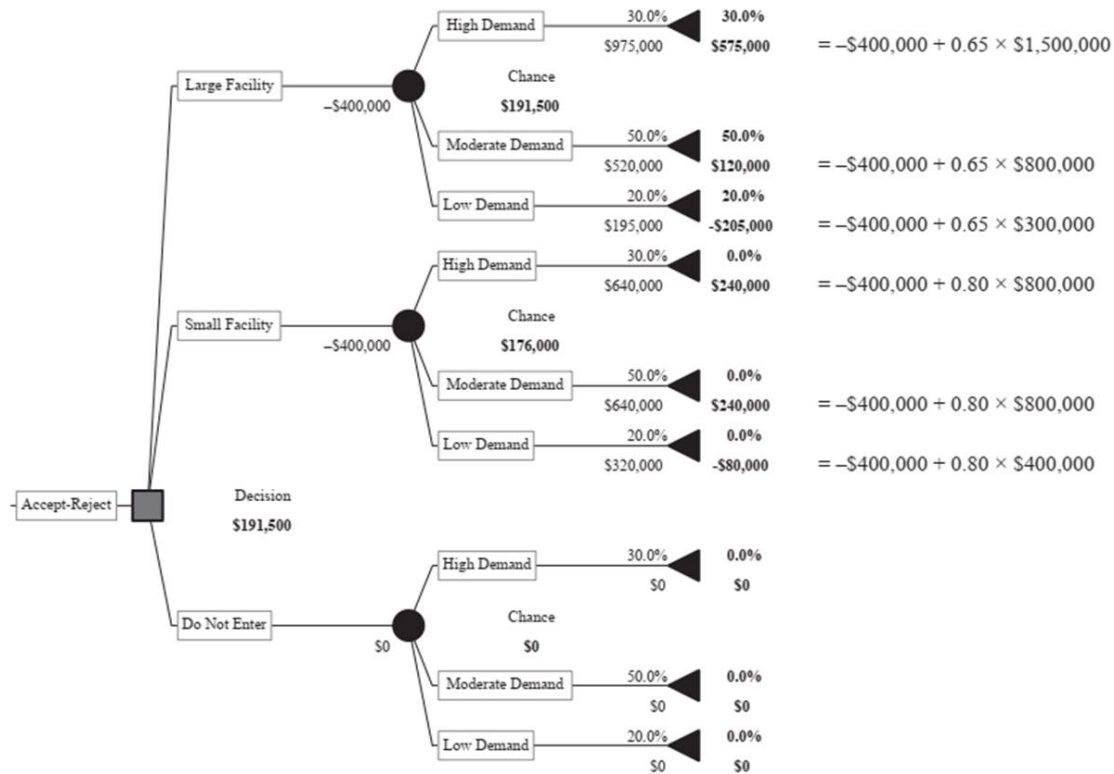


FIGURE 5.3
Decision tree for accept/reject decision to invest in the venture
Prepared using PrecisionTree™, Palisade Corporation.

With a one-time accept/reject decision, the entrepreneur cannot anticipate the level of demand that will be realized. The investment decision and choice of level of investment are made in light of existing uncertainty by maximizing expected NPV.

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1. Product-Market, Financial, and organizational strategy

- **Especially for new ventures, financial strategic decisions must be determined jointly with product-market and organizational strategic decisions.**
- The potential for success is greatest when these decisions are in harmony.
- **Financial strategy defines the type and timing of financing.** Strategic financial decisions include the amount of outside financing, target capital structure, staging of cash infusions, and so on.
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- **Product-market strategy involves the targeted sales growth rate, product price, product quality, product differentiation, whether to produce multiple products, and the like.**
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- **Organizational strategy concerns the horizontal and vertical boundaries of the firm and in whom decision-making authority resides.**
- As an illustration, suppose an entrepreneur were to conclude that rapid sales growth was the preferred strategy in the product market.
- The strategic choice to grow rapidly would commit the firm to a limited menu of financing options.
- Rapid growth usually requires external capital.
- The firm could choose to operate with high financial leverage, in which case it might sacrifice product-market and organizational flexibility and the entrepreneur would realize a residual return after debt service.
- Or, it might turn to equity capital, in which case the entrepreneur might have to secure agreement of other shareholders before acting and would have to share the total return with the outside investors.

1. Product-Market, Financial, and Organizational strategy (Cont.)

- **Compared to new ventures, the interdependencies among product-market, organizational, and financial decisions can be less significant in large, well-established organizations.**
- If a large company contemplates a strategy of rapid growth in a market that accounts for a small fraction of its total activity, that decision does not necessarily commit the company to a highly leveraged capital structure or the need to raise equity capital by selling stock.
- Thus, investors may not be harmed if the investment decision and financing decision are treated separately.
- **In fact, this principle of separation is the hallmark of large public corporations and an important difference from entrepreneurial firms.**
- Our point is that **for new ventures, product-market, organizational, and financial decisions need to be viewed simultaneously.**
- Simultaneous consideration helps guarantee that the first-best overall strategy is identified and selected.
- Thinking about product-market, organizational, and financial strategies as simultaneous rather than sequential choices takes us beyond the limits of intuitive decision making.

2. What makes a plan or decision strategic?

- It is useful to distinguish strategic decisions from other decisions along **three dimensions**:
 - **First, strategic decisions are consequential**. Unlike the decision of which way to drive home from work, strategic decisions involve substantial commitments of time and resources. They are of sufficient magnitude and importance that they are rare, and little precedent exists on which to base them.
 - **Second, strategic decisions are both active and reactive**. The decision is made in a competitive setting, with regard to the possible actions and reactions of others who have competing or complementary objectives.
 - In selecting among alternatives, the decision maker must consider the choices that may already have been made by others whose objectives overlap and must recognize that others may react to the decision.
 - The decision of when, where, and how to locate a retail store is strategic in this sense.
 - **Third, strategic decisions are costly to reverse**. If a decision maker selects a wrong course of action, she cannot simply retract it. Investments made to pursue the first course of action are, to some extent, sunk. Sunk investments limit flexibility because the full cost of changing direction must be compared to only the incremental cost of continuing in the same direction. Consequently, an initial wrong strategic choice is one from which the decision maker may never fully recover.

3. Financial strategy

- **Financial strategic choices have the same three elements.**
- A financing choice can limit future financing options in a variety of ways.
- For example, contractual provisions of a debt agreement may restrict the firm's ability to redeem the debt and replace it with equity.
- Existing debt financing may limit the financing sources available for new projects. And debt service requirements may limit the firm's ability to undertake new projects that would generate negative cash flows in the short run.
- **Competitive interdependencies are also present.**
- Financing choices that are costly to reverse or change involve sunk investments in arranging the financing.
- In such cases, a firm's financing choices may credibly commit the firm to a particular course of action that is observable by competitors, suppliers, customers, employees, and stockholders.
- Such credible commitments can influence the actions of these groups.
- For example, securing project financing can discourage others from moving ahead with plans of their own.

3. Financial strategy (Cont.)

- Conversely, announcement of intent to develop a new product, if not backed by a credible commitment, could touch off a scramble among rivals to be first in the market.
- ***For example***, when Airbus announced in 2000 that it was proceeding with the production of its super jumbo jet, the A380, Boeing immediately said that it too would introduce a new super jumbo jet to replace the aging 747. It was not until Airbus had secured financing and began investing in A380 production capacity that Boeing abandoned its plans for a 747 replacement and pursued the 787 Dreamliner.
- **The scope of financial strategy is quite broad.**
- It goes beyond the simple debt-versus-equity financing decision and includes such considerations as the connections between financing choices and growth, flexibility, and control.
- In addition, **financial strategy** includes such choices as the use of financial contracts to address or overcome informational asymmetries between entrepreneurs and investors and to better align the incentives of entrepreneurs and employees with the interests of investors.

4. Deciding on the Objective

- For many entrepreneurs, the decisions of whether to launch a new venture or continue in current employment and how to develop the venture are **made by intuition**.
- **Yet these are not decisions** where intuition is likely to lead to the best outcome.
- Also, some entrepreneurs place weight on qualitative considerations. They may, for example, take pride in having created something new or they may value self-employment.
- While **subjective considerations can be important**, our objective is to lay out an analytical framework that can help entrepreneurs and investors make better decisions.
- **Here, we propose a two-step process:**
- **First**, select the strategy that yields the highest estimated NPV (**maximizing NPV**);
- **Second**, make qualitative adjustments to the NPV by assigning **subjective values** to the considerations that are important to the prospective entrepreneur.

- **Strategic planning reduces the importance of intuition in the decision process so that entrepreneurs and investors can make better-informed decisions.**
- To achieve this, we must begin with an objective that can be measured.
- We assume that the entrepreneur's objective is to maximize the value of the venture to herself.
- Thus, in purely financial terms, 40% ownership of a \$5 million business is more valuable to the entrepreneur than 15% of a \$10 million business.
- The value of the entrepreneur's interest is what should influence the strategic choice.
- **This does not mean that the entrepreneur should substitute value maximization for utility maximization as the ultimate determinant of the choice.**
- Once the quantitative value of the entrepreneur's interest is determined, it is easier for the entrepreneur to assess the qualitative trade-offs related to such factors as control and security.
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- To illustrate, suppose, as an entrepreneur, you are offered two choices by a prospective investor. Under one you would retain control, and under the other you would not. In exchange for relinquishing control, however, you would receive additional compensation having a present value of \$100,000. You can then assess whether you would be willing to relinquish control in exchange for a \$100,000 increase in the expected value of your interest.

5.7 Recognizing Real Options

- **Strategic planning is not a one-shot exercise.**
- With the passage of time, original targets will be exceeded or missed, and new developments will render the initial plan obsolete.
- Rather than planning a single immutable course of action, **it is more useful to select the strategy that offers the highest expected value in light of the flexibility that the strategy affords for dealing with surprises.**
- Opportunities to abandon a venture, expand it, or change direction **are real options.**
- You can think of the focus of strategic planning as deciding which real options to acquire, retain, and abandon at key decision points.

Option Basics

- **An option** is the right to make a decision in the future.
- In the stock market, for example, **a call option** is a right to buy a share of stock at some future date for a price that is negotiated today.
- The right to buy a share of Spacely.com common stock anytime during the next 3 months at a price of \$110 is a call option with an exercise price of \$110, where the underlying asset is a share of Spacely common stock.
- **The value of the option depends on several factors:**
- Most basically, **a call option gains value** the more uncertainty there is about the eventual value of the underlying asset.
- **It gains value** if the market price of the underlying asset rises, and it loses value if the price of the asset falls.

Comparisons Between Real and Financial Options

- **Puts and calls on shares of stock are financial options.**
- **The underlying asset is a financial asset**, and exercising or not exercising the option **does not** affect the value of the underlying asset.
- In several respects, real options are similar.
- **As with financial options, the values of real options increase with the riskiness of the underlying asset and time to expiration.**
- The values of real options are also affected similarly by the difference between the exercise price and the underlying asset value.

Comparisons Between Real and Financial Options (*cont.*)

- Yet real options differ from financial options in important ways:
- First, **the markets for financial options are often complete**, meaning that :
 - calls and puts on a stock are available with the same exercise price and expiration date,
 - the underlying asset is freely traded, and
 - riskless borrowing is possible.
- If the market is complete, financial option value can be determined by appealing to the ability of investors to arbitrage risklessly any pricing disparities.
- In contrast, **real option markets are not complete and simple arbitrages are not generally feasible.**

Comparisons Between Real and Financial Options (*cont.*)

- **Second, real options are often interdependent in ways that make the application of formal option pricing models inappropriate.**
- **Financial options can be bought, sold, and exercised separately**, and the value of a portfolio of financial options is simply the sum of the values of the individual options.
- **Real options**, in contrast, are often interdependent, and the decision to exercise one may have implications for the values of others.
- Consequently, the value of a portfolio of real options often cannot be determined by simply adding up the values of the individual options.
- The term “**real options**” is used to stress their similarity to financial options while preserving the notion that there are important differences.

The Real Option Premium

- The cost of acquiring an option is called the **option premium**.
- Generally, financial options must be purchased from counterparties who consider the option premium to be sufficient to compensate them for bearing the risk that the option will end up being in the money.
- One important difference between real and financial options is that the real option premium bears no necessary relation to the **value** of the option.

Examples of Real Options

Option to wait

- If it is possible to postpone an action, the decision maker has an option to wait.
- Decisions involve comparing the value of acting now with the expected value of waiting.
- **Ex.:** The owner of a forest can cut the trees today or wait until next year when the trees will have grown larger and lumber prices may have changed.

Option to learn

- Learning options are similar to waiting options **except** that the focus is on the resolution of uncertainty.
- The option holder can either make the best choice in light of the uncertain future or wait until some important uncertainty is resolved.
- **Ex.:** A person who hopes to receive job offers from two different employers either could choose to minimize the expected commute today by buying a house located between the two or could wait for an offer and then locate near the ultimate employer.

Examples of Real Options (cont.)

Options to expand or contract

- An entrepreneur who has the ability to increase the scale of a venture, has an option to expand.
- One who has the ability to downsize, has an option to contract.
- An entrepreneur might decide to acquire an expansion option by purchasing a facility that is larger than the anticipated need.
- **Ex.:** An entrepreneur might acquire an option to contract by closing down a production line if demand is less than anticipated. The option can be acquired by building a flexible production process.

Options to switch inputs or outputs

- An entrepreneur has an option to switch inputs or outputs when she can alter the mix of a production process in response to market prices.
- An entrepreneur who designs a facility to operate on either electricity or natural gas has the real option to switch between these two inputs.
- **Ex.:** A refiner who can switch between producing heating oil and gasoline has the real option to switch outputs.

Option to abandon

- An abandonment option is a right to discontinue an activity and redeploy the real assets to some other use.
- **Ex.:** Abandonment options include the options to discontinue a research project, close a store, or resign from current employment.

TABLE 5.1 Examples of real options

Category of Option	Description	Examples
<i>Option to wait</i>	If it is possible to postpone an action, the decision maker has an option to wait. Decisions involve comparing the value of acting now with the expected value of waiting.	The owner of a forest can cut the trees today or wait until next year when the trees will have grown larger and lumber prices may have changed.
<i>Option to learn</i>	Learning options are similar to waiting options except that the focus is on the resolution of uncertainty. The option holder can either make the best choice in light of the uncertain future or wait until some important uncertainty is resolved.	A person who hopes to receive job offers from two different employers either could choose to minimize the expected commute today by buying a house located between the two or could wait for an offer and then locate near the ultimate employer.
<i>Options to expand or contract</i>	An entrepreneur who has the ability to increase the scale of a venture has an option to expand. One who has the ability to downsize has an option to contract.	An entrepreneur might decide to acquire an expansion option by purchasing a facility that is larger than the anticipated need. An entrepreneur might acquire an option to contract by closing down a production line if demand is less than anticipated. The option can be acquired by building a flexible production process.
<i>Options to switch inputs or outputs</i>	An entrepreneur has an option to switch inputs or outputs when she can alter the mix of a production process in response to market prices.	An entrepreneur who designs a facility to operate on either electricity or natural gas has the real option to switch between these two inputs. A refiner who can switch between producing heating oil and gasoline has the real option to switch outputs.
<i>Option to abandon</i>	An abandonment option is a right to discontinue an activity and redeploy the real assets to some other use.	Abandonment options include the options to discontinue a research project, close a store, or resign from current employment.

5.10 Rival Reactions and Game Trees

- **Decision trees do not explicitly incorporate the reactions of rivals or counterparties.**
- For example, consider a venture that offers an innovative line of 3D-printed athletic shoes.
- Its entry strategy—of price, advertising expenditures, geographic scope, and so on—may depend critically on how it expects incumbent firms to react.
- The firm may decide to enter with an aggressive pricing strategy, assuming that incumbents will keep their prices constant.
- But if incumbents react by pricing aggressively, then the effectiveness of the new entrant's pricing strategy will be reduced and perhaps a toehold entry strategy would discourage rival reaction and be better for the entrepreneur in the long run.
- Similarly, **the terms of an agreement that is negotiated between a VC and an entrepreneur can have game-theoretic implications.**
- For example, a **VC might be concerned that committing too much capital at an early stage might lead the entrepreneur to work less carefully on achieving the next important milestone, whereas investing a smaller amount might elevate the entrepreneur's concern about the difficulty of negotiating a fair valuation in the next round.**

- **Rival (and counterparty) reactions** are not an issue in perfectly competitive markets because other firms will not react specifically to the entry of a new rival and competition will mitigate the potential for holdup by an early investor (counterparty).
- For a small venture entering a large market or an entrepreneur who can deal with many potential investors, it may make sense to think of the market as nearly perfectly competitive.
- Furthermore, rival reactions are not an issue for a venture that offers a unique product and anticipates no entry, and therefore has market power.
- But planning for rival reactions can be important in settings where there are only a few actual or potential competitors.
- In such situations, **the decisions of the competing firms and counterparties are highly interdependent.**
- One way to evaluate decision choices **is to assign probabilities to rival reactions and use a decision tree to evaluate the choices.**
- This approach **is not likely to yield reliable results,** however, because the probabilities effectively yield a weighted average reaction from among the various possibilities, whereas **the actual reaction will be one choice or another.**

- There is a better way to think about the decision when rival reactions are important.
- The alternative is to explicitly assess what reaction would be in the best interest of each rival.
- The underlying reasoning is that a firm's actions and its rivals' are interdependent. Each firm is assumed to behave rationally by trying to select the strategy that maximizes value given what it believes its rival will do.
- Strategic interactions can be modeled by relying on the contributions of **game theory**.
- **Game theory is concerned with analysis of optimal decision making when decision makers are aware that their actions affect each other's behavior and take these interactions into account.**
- To illustrate the uses of game theory in formulating strategy, we need to introduce some new terminology.
- **A game consists of :**
 - (1) a set of players,
 - (2) an order of play,
 - (3) the information set available to the players,
 - (4) the set of actions available to each player, and
 - (5) the payoff schedule that results from the actions.
- **The players are simply the decision makers, such as an entrepreneur, a firm manager, a VC, or a rival.**

- The players make decisions at various points in a game (**decision nodes**).
- **In a decision tree**, the decisions are based on alternative states of the world, which are not strategic.
- **In a game-theoretic setting**, however, player actions are strategic and driven by rationality.
- The sequence in which decisions are made is the order of play.
- If all players make their decisions one at a time in a sequence, then the **game is a sequential-move game**.
- If all decision makers act at the same time, then **the game is a simultaneous-move game**.

- For an entrepreneur, it usually makes sense to think of the game as sequential, with the entrepreneur as the first mover.
- A sequential-move game can be analyzed with a **game tree**.
- A **game tree** is a joint decision tree for the players and is composed of nodes and branches like a decision tree.
 - *Each node* represents a decision point for one of the players.
 - *Each branch* represents a possible action for a player at that point.

Games Entrepreneurs Play

- Strategic “games” include a large class of activities in which a decision maker takes into account the actions and reactions of others.
- Strategic games commonly played by entrepreneurs include the following:
- **The business plan.**
 - An entrepreneur must decide how much optimism to build into the projections that are included in the plan.
 - Overoptimism can be dangerous.
 - The investor may counter with a proposed deal that ties the entrepreneur’s return to achieving the projections.
- **Strategic partnering.**
 - An entrepreneur must decide whether to bring in a vertically integrated company as a distributor and strategic partner or risk the possibility that, if not invited to partner, the corporation will independently develop a competing product.

Games Entrepreneurs Play (Cont.)

- **Control.**

- An entrepreneur must decide how much control to forsake in exchange for securing funding.
- If the entrepreneur is unwilling to give up control, a prospective investor might decide to forgo the opportunity.

- **Contract negotiation.**

- New venture contracting with investors is not a onetime event.
- Rather, it can involve several rounds with varying levels of information and changing values.
- The dynamic nature of contract negotiation makes the process game theoretic.

- **Information disclosure.**

- A new venture's management must decide whether to patent an idea now and risk copycat entry of rivals or maintain the idea as a trade secret.

SUMMARY

- **Strategic decisions** involve major commitments that limit the range of future actions. **Comprehensive strategic planning involves product-market and organizational choices that are highly interrelated with financing choices.** By considering all 3 simultaneously, the entrepreneur can be assured of identifying the alternative that yields the highest expected value.
- **A new venture can be thought of as a portfolio of real options, including, among others, the options to delay investing, to expand the size of the investment, and to abandon the investment.**
- **Strategic planning** is a process of identifying these real options and comparing the values of alternative combinations of real options.
- **Decision tree analysis** provides a framework for identifying and describing strategic alternatives and for identifying and managing the real options that are embedded in any new venture. The different **branches** of the tree describe the interplay between alternative strategic choices and uncertain states of the world. By starting at the ends of the branches, determining the highest-valued choice at each stage, and eliminating the other branches from further consideration, it is possible to identify the strategic alternative today that is expected to result in the highest overall expected value of the project.
- **Game tree analysis** is a useful extension of decision trees when the reactions of other parties to specific strategic choices are important.
- **Game theory forces the entrepreneur to think about a decision from the perspectives of others who will be affected by it.** In the context of a competitive game, it is important to consider the benefits of strategic flexibility relative to the benefits of strategic commitment.



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