

Options Thinking and Platform Investments: Investing in Opportunity

Bruce Kogut Nalin Kulatilaka

The world is witnessing a new era of competition with the development of new principles of organizing work, radical technologies, and globalization. For many firms, these transformations have biased managerial action towards myopic behavior and indecision. These transformations are similar to the changes that swept across the world at the turn of the century. In the United States and other countries, success was achieved through the willingness of entrepreneurs, firms, financial institutions, and government to invest capital for long-term payoffs. The building of the infrastructure in telecommunications, roadways, and electrical grids required massive amounts of invested capital. Organizing workers in the new ways of rationalized production required extensive experimentation and financial expense.

It is ironic that this willingness to invest is not validated by many of the financial criteria presently taught in business schools and practiced in industry. The problem is not that financial criteria have come to dominate decision making, but that there is a systematic bias towards the short-term in the kind of decision heuristics that managers and financial analysts apply to evaluating major investments. Even popular strategic planning tools, such as industry structural analysis, bias action away from making investments with long-term payoffs. The myopia that currently plagues American industry has its source in the financial criteria, planning tools, and especially in the incentives attached to managers' performance.

Over the past few years, there have been two streams of thought aimed at correcting this bias. One has been the formulation of strategic investments as real options. By real, it is meant that the investment is in physical and

human assets, as opposed to financial instruments. This stream of thinking has its origins in Stewart Myer's observations that the cash flows of many investments consist of income from the assets in their current use, plus a growth option to expand into new markets in the future.¹

The second stream consists of recent works on organizational capabilities and core competence.² This approach seeks to redirect the orientation of strategic planning from the exploitation of current resources to an emphasis on the creation of capabilities with long-term payoffs. It is, in fact, a prominent feature of current competitive conditions that the battle for survival in many industries concerns the speed by which new organizational practices are adopted (e.g., quality programs, kanban systems, or value-based activity analysis).

The formal apparatus of option valuation has been criticized as being too narrow and demanding to be applied practically to strategic decisions. In contrast, the notion of organizational capabilities has been accused of being too vague to further useful analysis. We seek to bridge these two streams of thought by developing a set of heuristics that view an organization's capabilities as generating platforms to expand into new but uncertain markets. These capabilities are considered options because they are investments in opportunity. Without making the initial stake, the firm would be unable to act to its advantage when opportunity does strike. Furthermore, these options are valuable for a broad range of applications. The techniques for analyzing platforms as options have developed rapidly over the past ten years. The problem is not so much analytical as it is conceptual.

Platform Investments as Options

Over the past few years, a wide body of applications of mathematical techniques has been developed to evaluate financial options. These techniques permit a price to be calculated for the value of the flexibility to exercise a given right, such as that of a being able to buy the stock of a company at a fixed price in the case of a call option. This flexibility is, obviously, more valuable when there is more uncertainty about the best investments to make.

Consider the case of a biotechnology company and an electric company. The shares of both companies are selling at a price of \$30. If an investor were to be given the right to buy shares of either company at \$32 within 30 days, holding the option to buy the stock of a biotechnology company is more valuable than that to buy the stock of an electric company. Either stock may finish the period at below \$32; the worse the investor can do is not exercise and receive, effectively, a payment of 0 for holding the option. In this case, the option has turned out to be of no value. But the biotechnology stock, because its price is more variable, has a better chance to be "in the money"; that is, its price has more upside potential because it is more volatile. The option on the biotechnology company is a more valuable

play on the upside potential, with the worse case being not to exercise at all, as in the case of the electric company option.

A common observation has been that the techniques used for valuing financial options of this sort are particularly well-suited to analyzing the complex and uncertain investment decisions facing managers. Indeed, many decisions have a straightforward option interpretation. Should a major oil company pump to full capacity today? If it pumps today, it has less oil in the future. If prices should rise, it would have oil to sell and to exploit the opportunity. Since more volatile oil prices increase the likelihood that it may pay to wait until the market takes off, the "option to wait" is more valuable when there is more price uncertainty.

Many options of this nature are *inherent* in an investment. If you are running a business, you have the option to abandon it. Should you abandon it now or wait? Obviously, it pays to wait if there is a higher chance that the market will be more valuable tomorrow and if it costs too much—as it always does—to close down an operation. If it turns out to be worse, the option to abandon is always there; it is inherent in any operating business.

We are concerned in this article with a more *proactive* kind of option, one that is not inherent but must be designed and planned. We call such options "platform investments" in order to cover two types of investment decisions. The first is the question of the design of an operating flexibility, such as whether it pays to buy robotics in order to automate a factory to produce many kinds of models depending on (uncertain) demand. The second is the growth option, as discussed earlier, which gives a firm the right to expand in the future into new product or geographic markets. This kind of investment captures the importance of investing rapidly in the opportunities critical to the growth and success of new businesses.

Platform investments are options on the future. This simple insight suggests that their value will be determined by the same factors that determine the price of a financial option. But because platform investments are real options, there are a few additional considerations which, in practice, turn out to be very messy for the purpose of arriving at easy methods of valuation. For example, whereas financial market expectations regarding the level and volatility of future oil prices can be easily gleaned from accessible trading data on crude oil future contracts, such data must be generated by the informed guesses of operating and staff managers for most kinds of investments. Many major investments, because they have an option-like quality, are more valuable than they appear in terms of simple discounted cash flows.³ Such undervaluations are to be expected when the investments are in new ways of doing things.

The Problem of Myopic Heuristics

Applying option models to operating and investment decisions would not be as difficult if there existed a set of explicit methods by which to evaluate

option opportunities. Such methods could then be embodied in the strategic planning tools and decision rules that serve as heuristics reflecting the prevailing wisdom on how to arrive at “best” performance. By heuristics, we mean the techniques used to identify and analyze problems. “Choose the project which has the highest net present value” is one heuristic; “enter markets only when you can win the most share of sales” is another.

There is no strategy that is best for all industries or at all times, but heuristics are often surprisingly robust. The choice of a heuristic is a compromise between ease of use and accuracy. Not everything can be measured and analyzed. Consequently, this compromise reflects the understanding of what rules support the achievement of best practices.

A common problem is that the notion of best practice changes more quickly than decision heuristics. Thomas Johnson and Robert Kaplan argue that accounting systems were developed during the first third of this century to track the cost of labor in the new mass systems of production.⁴ Even though the importance of labor expenditure relative to quality and speed of production has fallen dramatically since then, many managerial accounting systems still emphasize direct labor costs as a primary concern of measurement.

There is good reason to suspect that today’s heuristics are biased towards the short-term due to the evolution of particular institutions, ways of organizing, and rules developed during this century. Consequently, they ignore or undervalue platform investments. While these practices made good sense at one time, alterations are now required.

The following four sources of myopia are the most telling.⁵

Financial Institutions—A common complaint of managers is that financial institutions compel boards of directors and top management to focus on short-term profits. This complaint has, until recently, received little credence among academics convinced that equity markets properly weigh current and expected cash flows. Moreover, this skepticism has been reinforced by the gradual emergence in the U.S. and Japan of similar patterns of equity financing with financial institutions (e.g., through pension fund management) as the dominant holders of equities. Today, both Japan and the United States have approximately the same levels of debt to equity financing.⁶

The analysis of the short-sightedness of American financial institutions has, however, become more subtle. The issue is not so much the differences in the cost of finance among countries (especially since capital costs are much more similar among countries in today’s environment of integrated financial markets); rather, the factors affecting managers’ investment horizons lie more in the differences among countries regarding the role of financial institutions (especially banks) in the governance of corporations. In this regard, Japan and Germany look very different from the United States. In these two countries, banks and insurance companies are permitted to hold substantial positions in the debt and equity of industrial corporations.

In Japan, a "main bank" serves as the primary adviser to firms belonging to an industrial group. Estimates for holdings in 133 Japanese manufacturing firms in 1984 show that the largest debtholder (either a bank or insurance company) owns on average 22.3% of the debt and 6.2% of the equity. Because the main bank and institutions hold debt and equity positions in each other, consideration of the crossholdings would increase the centrality of the main bank.⁷

In Germany, three banks serve as the largest sources of capital to industry. Due to a custom whereby individuals give proxy voting rights to banks ("Depotstimmrecht"), their influence is substantially enhanced beyond their direct ownership of equity and debt. This influence is further strengthened by the veto rights of any major investment given to minority owners controlling more than 25% of the votes. In 1975, the three major banks controlled 43.2% of the voting rights for the 74 largest non-financial corporations with traded stocks; all banks (including investment companies) controlled 92.5%. Since little debt is raised through bonds (and when it is, banks are often the issuers), most firms rely upon loans from banks. Banks serve as the primary provider of loans to firms, and own and control equity positions in the largest companies.⁸

The concentration of financial power in Japan and Germany has certain benefits. One, it more clearly aligns the interests of debt and equity holders. In the U.S., in the event of bankruptcy, dissolution of assets will first be used to cover senior debt, which is often held by banks; hence, there is less incentive to maintain the firm as a going concern and bankruptcy is used as a way for senior claimants to recover the value of their loans. Two, banks have not only greater access to information, but they also disseminate information which improves the quality of strategic decisions. As a result, Japanese firms belonging to a *keiretsu* (industrial grouping) are less financially constrained than other independent Japanese firms.⁹

While the Japanese and German financial systems are not without their pitfalls, the incentives for investing for a longer horizon is greater in these two countries. Prior to regulations limiting the equity shares of banks and insurance companies in the United States, certain investment houses (such as J.P. Morgan) played a similar role in the American economy at the turn of the century to the one of German and Japanese banks today.¹⁰ At the present, the U.S. is struggling to change the current regulatory framework of financial institutions.

Budgeting Rules—The method of discounted cash flows (DCF) diffused widely among corporations in the post World War II period. While there is no doubt that DCF is superior to such alternatives as pay-back or internal rate of return as ways to evaluate investments, DCF also has severe problems. The principal problem is that DCF provides the wrong answer in the wrong direction just when the need for a good way to evaluate an

investment is the greatest. In stable environments, DCF provides an easy and instructive way to analyze the decision whether to commit resources to a new investment. It is mostly likely to fail in cases where the investment presents a platform for future expansion in highly uncertain environments. As shown below, the weakness of DCF is its failure to account for how uncertainty, rather than implying a higher discount rate, can increase the value of an investment.

Strategic Planning—One of the activities encompassed by strategic planning is the application of heuristics by which to identify profitable businesses for investment and expansion. One of the most well-known tools is the Boston Consulting Group (BCG) growth matrix, which was developed in the 1960s. In this matrix, an attractive business is indexed by its growth rate. Competitive advantage is driven by the share of the market held by a firm. Market share is a proxy measurement of a firm's cost position; thus, due to scale economies and experience effects, a firm with the largest market share will have the lowest costs.

This planning heuristic has the advantage of being simple; it is easier to measure relative market share than actual costs. Its success was driven by its compatibility with the expansion of mass production systems into new industries and markets. Volume strategies and low cost positions are inevitably linked to the concept of relative market share.

The technique of industry structural analysis, which was developed and diffused in the 1970s and 1980s, is more sophisticated.¹¹ By emphasizing the unique constellation of competitive pressures from rivals, suppliers, and buyers in a particular industry, this technique encourages the consideration of a wider menu of strategies. This approach focuses on exploiting a firm's resources in the context of specific market structures.

No matter how faulty the BCG growth matrix may be for some industries, it has the merit of encouraging the allocation of resources to new businesses for the long-term purpose of eventual market domination. Industry structural analysis places the stress more upon the exploitation of resources in a given market structure than upon the creation of new capabilities. It tends to underestimate, however, the importance of developing generalized resources (which not only provide entry into future markets, but also shape their evolution).

Strategic Business Units—Along with the development of planning techniques for the analysis of discrete businesses, corporations have created corresponding organizational divisions. These divisions, called "strategic business units" (SBUs), are delegated responsibility for the formulation of business strategy and for operations. The managers of the SBUs usually have their compensation linked to performance.

Though there are many merits to SBUs, they frequently lead to an underinvestment in projects with long-term growth. This problem may be more acute for many American firms than for their international counterparts, since the higher turnover rates among managers in the United States conflicts with the tracking of results over a long period of time. The recent trends towards strengthening divisionalization by "flattening" the organization and by increasing the role of short-term incentives in compensation have exacerbated this orientation towards the short-term.

A more subtle problem is that the divisionalization of businesses will interfere with the identification and exercise of the underlying growth options. An SBU may view an investment as unattractive, even though it creates a platform valuable for other businesses. There is less incentive in this system to invest if the value of the platform accrues to other SBUs.

The SBU structure discourages the development of "corporate assets." New technologies are invariably valuable for many different businesses. Product divisions conflict with the broad implications of developing new capabilities. In many cases, no SBU can make the case for investment in expensive and risky new technologies. A corporate "buy in" is required to relieve any single SBU of bearing the burden of developing corporate-wide capabilities. The failure is not of the SBU system itself, it rests instead with corporate management.

Underinvestment

In some industries, myopic rules may be reasonable. What works today will work tomorrow; the extra cost of planning for the future may drown out the minor benefits. However, most industries do not fall in this category, and myopic biases will hurt when it matters the most. As a rule, the hard-nosed policy of accepting projects only on the basis of a hurdle rate will guarantee failure in any fast-growth industry.

The competitive implications of myopia can be seen through a simple simulation. Consider two firms in the same industry: one myopic and one farsighted. The myopic firm uses the distribution of next period's net cash flows to forecast the future. The farsighted firm recognizes that the decision to invest creates a platform to expand in the future. We let each firm increase its investment capacity by one unit, and we let supply equal demand, a not unreasonable assumption for fast-growing industries.

We trick the simulation to look as if there is an option to expand by using a log normal distribution of net cash flows. The log normal has the property of a fat upper tail, which is a good way to represent the "option" value as a play on the upside. This tail also increases for the projection of cash flows further out in time, which captures the importance of looking into the more distant future. In the simulations, the far-sighted firm decides to invest or

not depending upon a forecast which incorporates a forecast of the value of the investment if the market should grow rapidly. The myopic firm forecasts the future on the basis of next period's cash flows.

In a stable environment, the performances of myopic and farsighted firms do not differ. In Figure 1, the simulated relationship between volatility of net cash flows and market share is graphed. Setting the volatility to 0, there is no difference in market shares after ten periods. These results underline the intuition that myopic behavior does not pay a penalty in stable and certain environments.

As the volatility of the net cash flows is allowed to increase, the penalty attached to myopia curves dramatically upward. With a volatility set to 50% of mean cash flows, the myopic firms are eliminated from the market. Farsighted firms, even though constrained to invest only by increments, quickly come to dominate the market. Platform investments, like financial options, are more valuable in volatile environments.

What generates these results? The primary culprit is the aggregate underinvestment by the myopic firms in an industry where early investments generate the potential to expand and to earn increasing profits in later periods. In this industry, uncertainty actually favors more rather than less investment.

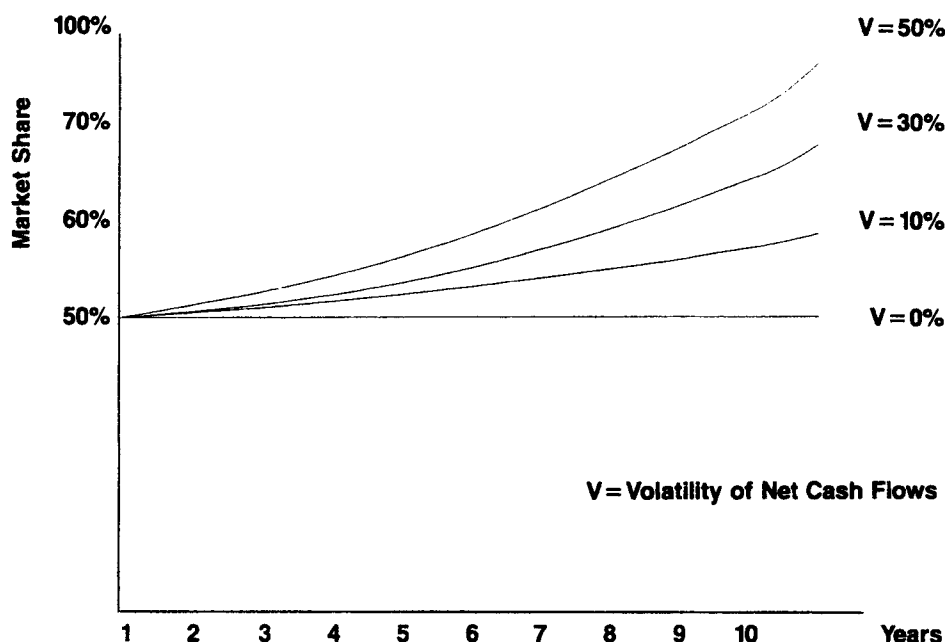
The issue is not that myopic policies fail under uncertainty; they fail when uncertainty represents opportunity. If the worse a firm can do is receive 0 net cash flows, then there is a fundamental asymmetry in profits and losses. The greater the uncertainty, the more likely will be the chance that the market will generate large profits; the worst case always remains 0. The only way to exploit this opportunity is to invest in the first place.

These results provide an interesting insight into two heuristic rules. In growing but uncertain markets, a heuristic that says accept projects that promise to pay 20% on invested assets (or on operating income) conveys the message, "Exit the market when uncertain." The heuristic that says "invest to capture dominant market share" is simple-minded but consistent with a farsighted vision of the evolution of industry profits.

But is the rule to grab dominant share always right when there is high uncertainty? The answer is obviously no. This is a bad rule if there is no advantage to early investment. And it is a bad rule if all competitors blindly follow the same policy. Ignoring competitors is trading one kind of myopia for another.

Heuristics for Platform Investments Formulation

Rules must be developed for the identification of potential platforms in investment alternatives. Sometimes these rules can be formalized to arrive at rather exact valuations. More often, however, they will serve to guide how opportunities should be identified and framed for analysis.

Figure 1. Market Share of Firms with Foresight

Platforms, as options, are valuable due to four conditions: uncertainty, opportunity, time dependence, and discretion (see Table 1). Obviously, flexibility is valuable only when there is uncertainty, yet understanding the source and properties of the uncertainty is a substantial problem. For example, it is difficult to describe the probabilities attached to the arrival of new technologies.

The value of a platform is related directly to the breadth of opportunities. It stands to reason that an investment with many potential applications is more valuable than one with a narrow set of opportunities. At the same time, some opportunities are more valuable than others because their potential market is more lucrative. An investment in some platforms leads to products and services that are more valued by customers.

A more subtle feature is time dependence. The application of option analysis to investments is important, because it captures the value in the dependence of decisions over time. Having the ability to switch production from one kind of vehicle to another is only possible if an investment has been made earlier in flexible manufacturing systems. The issue of time dependence is one of the most complex problems in understanding the value of a platform investment. If the investment strategy can be quickly imitated, then there is no advantage for investing early. Similarly, if there is a high

chance that a competitor will act first by preempting a market, then the value of investing in an option runs the threat of being eradicated over night.

A critical issue in the valuation of a platform is whether the investment is accompanied by the discretion to exercise the option. Many firms complain that they have more technologies than they use. It is not uncommon to hear the complaint that the benefits of investment in a technology were reaped by other firms. Witness the efforts of Texas Instruments and Honeywell, both of whom had to resort to the courts to collect on patented technologies. Competitors can sometimes have better incentives and information on how to apply a company's own technology to new markets.

Firms investing in platforms frequently face "windows of opportunities" during which they must act to exploit their investments. Appropriate information systems are necessary to identify these opportunities in a timely way. Incentives must be in place in order to reward managers for acting promptly. Failure to benefit from platform investments is often due to deficiencies in the design of information flows and managerial incentives. New heuristics without proper information and incentives are of no value.

Platform Investments as Capabilities

Organizational capabilities—e.g., creating quality, being more flexible, and responding to the market quickly—are the most important platforms that a firm can build, because they support investment strategies into a wide spectrum of opportunities.

Investing in opportunity is important in businesses where the capability to expand is not easily acquired. The capability to expand is linked to reputation and to technologies. Reputation is hard to build quickly; similarly, the ownership of particular technologies is not easily attained. It is easy to advise a firm that it should compete by increasing the perceived quality-to-price performance; the hard part is learning "how" to achieve the reputation for performance. Similarly, the important aspect of technological expertise is not simply the possession of a patent, but the capability to engineer new products consistently over time. Capabilities represent the accumulated skills of what corporations become best at doing.

These observations lead to a very simple point. The value of platforms as options ultimately comes down to viewing organizational capabilities as investments in learning and acquiring a broad-based expertise.¹² Prahalad and Hamel have suggested that these capabilities be understood as "core competencies" in particular technologies.¹³ These capabilities need not be restricted to technologies, but to the wider organizational capacity to develop new products and services, to bring them quickly to the market, or to market and distribute them effectively.

Organizational capabilities essentially consist of how a firm develops the expertise of its employees, through the way in which they are organized

and rewarded and through the way in which information is gathered and disseminated. As shown in Table 1, these capabilities represent the most important kind of options. They provide a platform into a wide number of opportunities. The ability to create new technologies is likely to generate a more vast potential than the opportunity associated with any one technology.

Organizational capabilities are important because they are hard to imitate or preempt. A competent group of engineers can reverse engineer and imitate many kinds of technologies. The hard part is learning how to build this group and coordinate product delivery to market. This capability is difficult to acquire, as it is often poorly understood and inadequately described in operating manuals.

The difficulty many corporations have had with adopting new capabilities has been that the benefits are often hard to measure. The benefits of new quality programs have been especially difficult to gauge, with estimates rarely being made and usually varying widely. No wonder that efforts to implement programs often appear as missionary. Not only are the data missing; there is not an understanding of what costs and benefits need to be measured to evaluate the investment in quality programs.

Four Examples—Organizational capabilities are unlikely to be subject to the careful financial evaluation of other kinds of investments. Often, new capabilities are learned due to survival pressures. Most firms in the auto industry have adopted the capability to lower inventories by just-in-time systems and to speed product delivery by reliance on external sourcing. Yet, the investment in new capabilities and platforms is often delayed or neglected due to the failure to understand the option value. Consider the following examples.

Core Technologies—A popular Silicon Valley adage is that certain products are important as “technology drivers.” The manufacturing of memory semiconductors has played the role of driving the accumulation of experience in design and high-volume production. Learning that is gained in the product development of one memory generation serves as a basis for lowering the costs of subsequent generations.

This experience is not only useful for subsequent memory products, but also serves as a platform for diversification into other industries. In a study of the diversification of start-up companies in the semiconductor industry, Dong-Jae Kim found that firms with experience in the design of memory devices expanded significantly into other related areas. Start-ups in certain markets, such as application-specific integrated circuits (ASICs), not only did not diversify; they were also far more likely to fail or be acquired.

These results fit well with what we know of larger semiconductor firms that withdrew from memory production to stem their losses in this highly competitive market, only to discover the harmful effects on their other

Table 1. What Determines the Value of a Platform?

- Uncertainty
- Venue into Multiple Opportunities
 - A broad opportunity set
 - Customers perception of the value of derived products and services
- Time Dependence
 - Proprietary and difficult to imitate
 - Risk of preemption
- Managerial Discretion to Exercise the Option

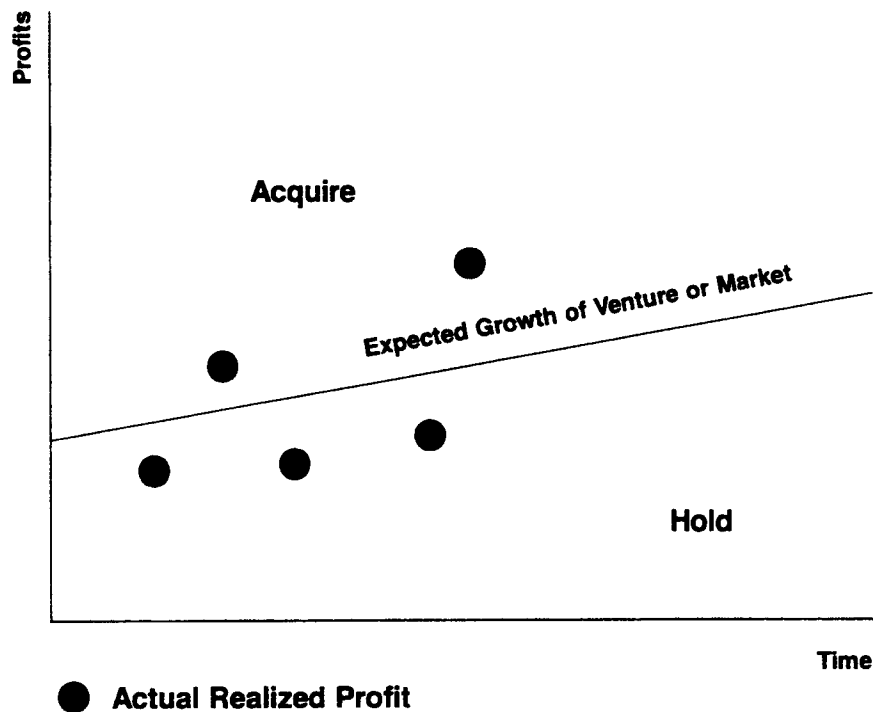
products. In the case of Motorola, it withdrew and later reentered. Other firms withdrew and continued on a downward spiral. However, even if a firm makes the decision to reenter, the competition has already moved on.

Technology drivers are platforms. They generate proprietary learning and they serve as points for expansion into other markets. The failure to recognize core technologies can lead to devastating results. A large electronics firm scrapped its cellular business in the 1980s, only to re-enter by acquisition a few years later. If it had kept the option “alive” by maintaining a small research and development activity, the capability to expand when the market turned-up would have been in place. The operating costs to keep the group running would have been low, at least in comparison with the high premium paid for the subsequent acquisition.

Joint Ventures—An alternative to scrapping a project is to share the costs of running the activity with a partner. Frequently, the advantage of a joint venture is that the partners bring different capabilities to the cooperation. Motorola’s reentry into the manufacturing of memory semiconductors was aided through a joint venture with Toshiba in exchange for microprocessor technology. As the Nummi joint venture between General Motors and Toyota indicates, the learning of new skills is facilitated by replicating the organization in the form of a joint venture.¹⁴

There is one complicating feature to joint ventures: they often do not last very long. The median life of a manufacturing joint venture in the United States is about 6 years. This gloomy figure is misleading, however, for most of these ventures terminate by acquisition. Figure 2 illustrates the relationship between profitability and the acquisition of the venture. The line indicates the expectation of profit based on a historical growth rate. (In this sense, this line corresponds to the expectation of the myopic firm, given in our earlier simulation.) Joint ventures tend to terminate when the industry begins to show unusual growth and the profits to early entrants increase. In this case, the joint ventures are not dissolved, but rather are acquired by the one of the partners. When the industry does poorly, however, the

Figure 2. Timing of Exercise to Acquire Joint Venture



partners neither dissolve nor acquire it. They maintain a hold position since there is no reason to throw away an already-bought option and since it is often better (if the holding and operating costs are not too high) to wait and see what opportunities present themselves in the future.

Joint ventures often carry an important option value. They are frequently used in high growth markets when neither partner has the necessary skills nor wants to bear the full risk. When the industry begins to grow quickly, the partners must invest more in order to exercise the option to expand with the market. It is at the moment of new investment that the partners realize they put different valuations on the opportunity. One partner buys it; the other one is bought out with capital gains.

These kinds of joint ventures are platform investments. They transfer and develop capabilities which serve as points of entry into uncertain markets. That they are so frequently acquired underscores their value for the development of organizational capabilities.¹⁵

Flexible Manufacturing Systems—One of the most important dimensions of competition is the capability to respond flexibly. There are many ways to achieve flexibility, from sub-contracting policies to product design. Some

investments are made, however, with the sole purpose of achieving the flexibility to respond to uncertain markets. Flexible manufacturing systems are an example of a decision to purchase the ability to reprogram industrial machinery in order to increase the variety produced by the same capital equipment. This flexibility makes it possible to respond to shifts in customer demand as well as to offer greater customization of the product.

Installing flexible manufacturing systems appears to be relatively easy. The number of vendors willing to sell the hardware and provide software services is staggering. Yet, the experience with flexible manufacturing systems has often proven to be disappointing.

Robert Stempel of General Motors has commented:

We've tried automation without knowledgeable workers, and it doesn't work. . . . We put a tremendous amount of automation and electronics into our Cadillac plant in Hamtramck. And we couldn't run it because our people didn't understand what we were asking them to do.¹⁶

The difficulty of FMS is that the flexibility of the physical assets is nested in the organizational capability of the firm to operate flexibly. Physical equipment promising flexibility can be easily bought on the market. The more important platform value is the development of the capability to know how to run a plant flexibly, and then to expand this organizing heuristic to other operations.¹⁷

Country Platforms—In the home country, managers take for granted that when a new product is launched, the customer already knows the brand label, the distribution channels are in place, and the salesforce knows the product and buyer. The product manager evaluating a new proposal need not calculate the cost of establishing these invisible assets of goodwill and acquired knowhow.

An iron law of competing internationally, however, is that the first investment overseas will lose money. An investment in a foreign market underscores dramatically the value of owning platforms for sequential product launches. There may be few corporate and business assets established in the country. Because of the SBU incentive system, the costs of launching a single product appears as exorbitantly too high.

This view is clearly myopic, for the first investment establishes a country platform for the future. By establishing distribution channels and learning how to do business in a country, the initial entry generates the capability to launch subsequent products from this platform. The investment as a stand alone project may look unattractive, but the platform value is especially large for the first entry.

The importance of this platform is reflected in the debate on whether the product should carry a corporate label or be uniquely advertised. The corporate label establishes a platform by advertising the firm; advertising the

product will result in higher market penetration. The choice comes down to evaluating the option value in the corporate label against the foregone revenues by not advertising the product.

The bias in a myopic approach is frequently revealed in country risk analysis. When confronted with a choice between investing in a developing country with a volatile market and a developed country, a manager is often advised to slap down a risk premium on the developing country project. Yet, if the initial investment is largely important for establishing a platform, the higher variance of the developing country should actually be seen as attractive. The upside of a Mexican investment is much larger for many products than the most optimistic scenario of an investment in the U.S. or other developed countries.

There is reason to be cautious, however. As shown in Table 1, a platform investment is only valuable when acting today provides the capability to seize an opportunity in the future. Investing in a country carries no platform value if there is no advantage for early investment. For many firms already exporting to Europe, the 1992 policies of the European Community presented exactly this dilemma. With brand labels and distribution channels in place, the argument to invest before 1992 as a platform is *not* persuasive. Table 2 illustrates why this case is not a platform. For this analysis, the project with the plant in Europe against the export operation should be compared. We make the assumption that a new plant can be built in a year for a cost of 200. If a policy raising tariffs is imposed, the export operation pays a penalty of no sales until a European plant comes on stream. If the plant investment costs 200, the project with the new plant earns a net cash flow of -100 in the first year (investment costs plus the 100 from continued exports). The export project only builds the plant if barriers are imposed, and pays the investment cost of 200, with no export earnings for one year while the plant is being built. The cash flows for exporting should then be weighted by the probability of such a policy imposition.

This analysis is standard in any capital budgeting procedure; no platform value need be considered. As long as the option to invest in the future remained open, an early investment in a manufacturing plant generates little in the way of a platform; there is no time dependence. We could, of course, make the case that the plant builds goodwill with the Community which serves future product entries. But our point is that the case for such a platform has to be made and evaluated against the costs; it cannot be simply assumed and used to rationalize every investment.¹⁸

Short-Run Accountability for Long-Run Results

The last example of the burden on a SBU in making a first investment in a country points to the importance of a corporate vision. If a country is deemed as vital, the corporate office should be willing to underwrite part

Table 2. Cash Flows of European Plant Versus Export

	1990	1991	1992	1993	1994	1995
European Plant	-100	100	100	100	100	100
Export						
If No Barrier	100	100	100	100	100	100
If Barrier	100	100	-200	100	100	100

of the investment. The criticism of this kind of proposal is the charge of the loss of accountability (which is the mirror image of the problem of discretion noted in Table 1). There can be little doubt what the response from a room of SBU managers will be if corporate headquarters states that losses will be underwritten for investments into country X. The only problem will be sorting out which manager has the right to lose the money first.

A policy of funding platforms must resolve the problem of accountability. If the investment were to be in a financial stock option, prices of the security could be tracked even if a market for the option did not exist. Such markets do not exist by which to compare an investment in long-term capabilities. What, then, should be the criteria by which to monitor the platform value?

Most companies implicitly monitor this value. Figure 3 provides an example for evaluating a joint venture. The performance of the venture is measured along two lines. The first is the net cash flows (including dividends, transfer payments, and other fees) from assets currently in place. The second is a set of criteria for examining the progress of the venture along other lines. If the purpose is to learn new manufacturing techniques, the rate of what is to be learned over time should be established and then performance measured against this benchmark. The extent to which brand labels are recognized or knowledge of government regulatory bodies is improved can also be measured and evaluated on a year-by-year basis against the goals established at the time of the venture formation. The hard part, however, is understanding that these investments are valuable only if discretion is exercised; so every evaluation must also have an understanding of the menu of opportunities that should have been exploited.

Figure 3. Evaluation of a Joint Venture

Profits from Venture As Is:

- Fees
- Dividends
- Margins on sales to venture

Evaluation of Platform:

- Brand label recognition
- Transfer of skills to other businesses
- Acquisition of contacts with new customers
- Improved relations with government regulatory bodies

In some cases, the evaluation can be made more exacting by estimating the value of the option over time. Reasonable benchmarks have been suggested for the evaluation of the option value of oil drilling, flexible manufacturing, and other investments whose value depends upon a price of a commodity or instrument traded in markets. For example, the value of establishing two plants with excess capacity in two countries with the option to switch overtime between them is primarily a function of exchange rate (or relative price) movements. This type of option is amenable to formal evaluation.

Ultimately, accountability rests with managers, who must gather the appropriate information for measurement and must understand the sources of uncertainty for defining when discretion should be taken. It may be difficult to break away from using the standard financial criteria of hurdle rates. Neglecting other forms of measurement will cause the evaluation system to tend inevitably toward myopic measurements.

Market Structure and the Risk of Preemption

The emphasis upon organizational capabilities and platforms should not lead to an underestimation of the competitive environment. Since platform investments can dramatically alter the structure of a market, it is important to understand how strategy itself influences the evolution of the industry. Clearly, the decision to invest in a country will generate competitive responses, which then influence an array of strategic variables such as prices, retaliation, and increases in output. The most difficult aspect of the analysis of platforms is incorporating the actions and responses of competitors.

It is important to understand how these investments influence a firm's commitment to a market. Too much flexibility can send the wrong signal in industries where entry is imminent. The option to wait before launching a

new product that cannibalizes existing sales is attractive for a leader, until someone else enters and exploits the opportunity.

Though these are difficult issues, a few heuristics can be given with confidence. A common piece of advice has been that it is better to wait than to commit too early to a technology when there is high uncertainty over what customers want. Yet, at the same time, early commitment to a technology is often the way in which uncertainty is resolved; by early commitment, a firm can influence the evolution of the industry to favor their platform. As a rule, early commitment in such industries will tend to dominate the advantages of waiting.

Of course, there are cases when early commitment is not advisable. A good example is the restriction on the sale of cellular phones and services by some governments. In Japan, one electronics company developed what its managers felt were advanced proprietary technologies. This investment raised the costs of development and, consequently, the price of the phone. Offering less expensive but still high-quality systems, Motorola and NTT won the two licenses granted by the ministry for telecommunications to serve a particular region in Japan.

If not for the government restrictions, the investment in new cellular technologies may have proved worthwhile. The high costs of the technologies would cause initial losses, but there were anticipated benefits. Learning how to apply, develop, and manufacture products using the technology is earned over time; customers may then identify the technology with the firm (e.g., Xerox or Velcro). But neither benefit can be gained without experience selling to a market; government regulation eradicated the value of this platform.

The Luxury of Losing Money

It is important for financial institutions and corporate management to underwrite losses in the short-run if there are to be any long-term advantages. Of course, Keynes's dictum that "we are all dead in the long-run" has a peculiar implication. Firms unable to finance these losses get locked in a vicious cycle, whereby concerns over surviving the threat of bankruptcy dominates the ability to invest in the long-run. In the meantime, firms with sufficient foresight and resources are on a virtuous cycle of investments in capabilities which build the platforms for years to come. Not surprisingly, firms that begin their lives during difficult times have a hard time catching up; they never had the luxury of being able to invest for tomorrow.¹⁹

It has been a point of contention over the past few years that trends such as leveraged buyouts forebode a brighter future—the resulting debt burden forces management to bear down on the fundamentals of making money. However, the evidence shows that too severe pressure on cash flows drains money from R&D and other investments with long-term payoffs.²⁰ In

industries with substantial growth opportunities, Keynes' dictum will be proven right just because the short-run question of survival dominates the necessity of foresight.

The United States and many other countries have now emerged from a decade of excess that centered on the short-run. Many corporations are flatter and more focussed than ever. If they face a danger, it is the failure to develop heuristics to guide investments for future growth. The idea of a platform investment is directed at developing such heuristics to aid the understanding of how capabilities must be built in anticipation of the future. Flexibility is of no value in the absence of the resources required for execution. Learning new capabilities is ultimately the most critical investment in opportunity for the long haul.

References

1. See Stewart Myers, "Determinants of Corporate Borrowing," *Journal of Financial Economics*, 5 (1977): 147-175; see also S. Myers, "Finance Theory and Financial Strategy," in A. Hax, ed., *Readings on Strategic Management* (Cambridge, MA: Ballinger, 1984). These ideas have been expanded by Carl Kester, "Today's Options for Tomorrow's Growth," *Harvard Business Review* (March/April 1984); William Hamilton and Graham Mitchell, "What Is Your R&D Worth," *The McKinsey Quarterly* (1990), pp. 150-160; and Tom Copeland and Jon Weiner, "Proactive Management of Uncertainty," *The McKinsey Quarterly* (1990), pp. 133-152; Leon Trigeorsis and Scott Mason, "Valuing Managerial Flexibility," *Midland Corporate Finance Journal* (1988), pp. 14-21.
2. See Jay Barney, "Strategic Factor Markets: Expectations, Luck, and Business Strategy," *Management Science*, 32 (1986): 1231-1241; Richard Rumelt, "Towards a Strategic Theory of the Firm," in Robert Boyden Lamb, ed., *Competitive Strategic Management* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1984); Sidney Winter, "Knowledge and Competence as Strategic Assets," in D. Teece, ed., *The Competitive Challenge—Strategies for Industrial Innovation and Renewal* (Cambridge, MA: Ballinger, 1987); and David Teece, Gary Pisano, and Amy Shuen, "Resource-Based View of the Firm," mimeo, 1991.
3. There are more technical obstacles to the application of exact formulations, with a principal problem being the strong assumptions of "risk-neutral" valuations in the absence of arbitrage opportunities. Techniques, such as Monte Carlo simulations or decision trees, generally ignore entirely the option value, even they treat uncertainty explicitly.
4. Johnson and Kaplan, *Relevance Lost: The Rise and Fall of Management Accounting* (Boston, MA: Harvard Business School Press, 1987).
5. For two explanations, see Michael Dertouzos, Richard Lester, and Robert Solow, *Made in America: Regaining the Productive Edge* (Cambridge, MA: MIT Press, 1989); and Michael Porter, ed., *Investment Horizons in American Business* (Boston, MA: Harvard Business School Press, forthcoming).
6. Useem and Gottlieb estimate the share of institutions holding equity in the U.S. to have risen from 29% in 1980 to 46% in 1990. See Michael Useem and Martin Gottlieb, "Corporate Restructuring, Ownership-Disciplined Alignment, and the Reorganization of Management," *Human Resource Management*, 29 (1990): 285-306. Unpublished data from the Tokyo Stock exchange shows financial institutions holding 38.5% of Japanese equity in 1980 and 42.5% in 1988. For an overview, see Michael Porter, "Capital Disadvantage: America's Failing Capital Investment System," *Harvard Business Review* (September/October 1992), pp. 65-82.

7. Stephen Prowse, "Institutional Investment Patterns and Corporate Financial Behavior in the United States and Japan," *Journal of Financial Economics*, 27 (1990), pp. 43-66; Michael Gerlach, "The Japanese Corporate Network: A Blockmodel Approach," *Administrative Science Quarterly*, 37 (1992): 105-139; and Erik Berglof and Enrico Perotti, "The Japanese Financial Keiretsu as a Collective Enforcement Mechanism," working paper #91-09, MIT Japan Program, 1991.
8. The data are summarized in Bruce Kogut, "Capital Structure and Financial Institutions in the Federal Republic of Germany," unpublished manuscript, 1982; primary data are drawn from Studienkommission, *Grundsatzfragen der Kreditwirtschaft*, Bericht der Studienkommission, Ministry of Finance, (Bonn: Wilhelm Stollfuss Verlag, 1979); reliance on short-term debt is described in Charles Calomiris, "Regulation, Industrial Structure, and Instability in U.S. Banking: An Historical Perspective," mimeo, Wharton School, University of Pennsylvania, 1992.
9. Takeo Hoshi, Anil Kashyap, and David Schaftstein, "Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships," in R. Glenn Hubbard, ed., *Information, Investment, and Capital Markets* (Chicago, IL: University of Chicago, 1990).
10. J. Bradford Long, "Did J.P. Morgan's Men Add Value?" in Peter Temin, ed., *Inside the Business Enterprise: Historical Perspectives on the Use of Information* (Chicago, IL: University of Chicago Press, 1991).
11. Michael Porter's *Competitive Strategy* (New York, NY: Free Press, 1980) represents the most well-known statement of this approach.
12. See Bruce Kogut and Udo Zander, "Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology," *Organization Science*, 3 (1992): 383-397. Carliss Baldwin and Kim Clark ["Capabilities and Capital Investment: New Perspectives on Capital Budgeting," working paper 92-004, 1991, Harvard Business School] develop in detail the link between options and capabilities.
13. Prahalad and Hamel, "The Core Competence of the Corporation," *Harvard Business Review* (May/June 1990), pp. 79-91.
14. See the fascinating account by Paul Adler, "The Learning Bureaucracy: New United Motor Manufacturing," forthcoming in B. Staw and L. Cummings, eds., *Research in Organizational Behavior* (Greenwich, CT: JAI Press, forthcoming).
15. See also, Bruce Kogut, "Joint Ventures and the Option to Acquire and to Expand," *Management Science* (1991), pp. 19-33.
16. *Fortune*, 1992, p. 60; cited by Bernard Wolf and Steven Globberman, "Strategic Alliances in the Automotive Industry: Motives and Implications," mimeo, York University, 1992.
17. See also, Nalin Kulatilaka, "The Value of Flexibility: The Case of a Dual-fuel Industrial Steam Boiler," Financial Management Association, 1993, pp. 271-280.
18. See also, Bruce Kogut and Nalin Kulatilaka, "Operating Flexibility, Global Manufacturing, and the Option Value of a Multinational Network," *Management Science* (forthcoming).
19. See Glenn Carroll and Michael Hannan, "Density Delay in the Evolution of Organizational Populations: A Model and Five Empirical Tests," *Administrative Science Quarterly*, 34/3 (1989).
20. See Bronwyn Hall, "Corporate Restructuring and Investment Horizons," Working Paper #3794, National Bureau of Economic Research, 1991.