



Falling Off the Fence?

A Realistic Appraisal of a Real Options Approach to Corporate Strategy

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Finance's option theoretic framework has recently been extended into a prescriptive approach to corporate strategy. This "real options" approach has refocused managerial attention on the strategic value of holding flexible positions in increasingly turbulent environments. However, emerging descriptive research on real options has begun to reveal isolated examples of the problems inherent in doing so. The author embeds the real options approach within an organizational setting to gain a more general understanding of how the pursuit of firmwide flexibility can carry with it unintended consequences. Drawing broadly from organization theory, he notes how the normative implications of real options reasoning can sometimes lead to excessive flexibility that disrupts the internal operations of a firm and threatens its external legitimacy over time. He then discusses how a firm may alleviate some of these problems, allowing it to gain more of the benefits of a real options approach without suffering the pitfalls. The author concludes with a brief summary and suggestions for future research.

Keywords: *real options; flexibility; legitimacy*

Once upon a time in New York City, there lived an Assistant Professor of Finance. He and his "spouse-equivalent" had separate rent-controlled apartments. Their relationship progressed to a point when the woman suggested that they should keep one of the apartments and give up the other. He explained to her the importance of keeping options alive: it was unlikely that they would split up, but given a positive probability, and so on. She took this very badly and ended the relationship. Financial economists who hear this story say that it just proves how right the man was about option values. But the economics of information offers a more convincing explanation.

The man misunderstood the situation. This was not a decision problem under uncertainty, but a signaling game. The woman was unsure how highly he valued her, and it was precisely his willingness to undertake the costly irreversible action of giving up the apartment that had value as a signal. The man overlooked this, tried to sit on the fence, and fell flat on his face.

—Dixit (1992, p. 127)

Flexibility is double-edged. As is the case with assistant professors of finance, organizations that maintain multiple options can more quickly adapt to

changing circumstances, but the mere possession of such options sends signals that may degrade current and future positions. The clear economic logic that flexibility is valuable must be tempered by the understanding that flexible positions are built, maintained, and executed within a social setting.

In this article, I examine this double edge of flexibility from a real options perspective. Finance's option theoretic framework (e.g., Black & Scholes, 1973) has recently been extended into a prescriptive approach to corporate strategy. This "real options" approach has refocused managerial attention on the strategic value of holding flexible positions in increasingly turbulent environments (e.g., Amram & Kulatilaka, 1999; Bowman & Hurry, 1993; Dixit & Pindyck, 1994; Kogut & Kulatilaka, 1994; Luehrman, 1998; McGrath, 1997; Trigeorgis, 1996). However, emerging descriptive research on real options has begun to reveal isolated examples of the problems inherent in doing so (e.g., Busby & Pitts, 1997; Reuer & Leiblein, 2000). I embed the real options approach within an organizational setting to gain a more general understanding of how the pursuit of firmwide flexibility can carry with it unintended consequences. Drawing broadly from organization theory, I note how the normative implications of real options reasoning can sometimes lead to excessive flexibility that disrupts the internal operations of a firm and threatens its external legitimacy over time. I then discuss how a firm may alleviate some of these problems, allowing it to gain more of the benefits of sitting on the fence without actually falling off of it. I conclude with a brief summary and suggestions for future research.

A REAL OPTIONS APPROACH TO STRATEGY

Today's business environment is popularly characterized as a "blur" (Davis & Meyer, 1998) in which successful managers are "managing at the speed of change" (Conner, 1993). Strategy has been labeled "structured chaos" (Brown & Eisenhardt, 1998). "Only the paranoid survive" (Grove, 1996) by "competing on the edge" (Brown & Eisenhardt, 1998), always wary of the perils of "hypercompetition" (D'Aveni, 1994). The

strengths that bring success in one environment can quickly become the rigidities that lock a firm into an ineffective strategy in another environment (Bowen, Clark, Holloway, & Wheelwright, 1994; Miller, 1990). Even if a firm recognizes and accepts the need for change, it may be unable to catch up to the competition (Dierickx & Cool, 1989). Early-moving competitors may have raised the bar out of reach. Battles for market leadership and standards for technologies with increasing returns to scale make permanent market lockout a very real and frightening possibility (Arthur, 1989; David, 1985).

The role of strategy is to help a firm win its continuous battles for existence by ensuring that its capabilities match environmental demands (Lawrence & Lorsch, 1967). The more uncertain the future, the less likely that a firm's current stock of capabilities will meet or exceed tomorrow's demands. If a firm's current strengths are quickly made irrelevant, then traditional industrial organization strategies of erecting barriers to guard against competitors leave firms in the lurch (e.g., Porter, 1980). Although competitors may be kept at bay, the environment cannot. Well-defended products are worthless if demand changes. The resource-based view of the firm (Barney, 1986; Penrose, 1959; Wernerfelt, 1984), with its prescription of building capabilities based on a firm's unique resource base, also becomes problematic. Long-term investments to build these capabilities are unlikely to pay off because by the time they are built, environmental demands will surely have changed. Core capabilities arguments (Prahalad & Hamel, 1990) suffer the same flaw. In a fast-changing world, no matter how well protected (Porter, 1980), rare, valuable, imperfectly mobile, and nonsubstitutable¹ (Barney, 1986) a product or service is today, it may be worthless tomorrow.

These theories provide incomplete guidance for those managers operating in turbulent environments, and, as it were, turbulence seems to characterize the vast majority of environments, occurring "across the board, even in the most sedate industries . . . few industries and companies have escaped this shift in competitiveness" (D'Aveni, 1994, p. 4). The real options approach purports to fill this harrowing void by offering a way to battle uncertainty (McGrath,

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1997), capitalize on uncertainty (Amram & Kulatilaka, 1999; Garud, Kumaraswamy, & Nayar, 1998), and even make uncertainty “your friend, not your enemy” (Coy, 1999, p. 118).

Myers (1977) is commonly credited with first noticing that capital investments are, in many ways, analogous to financial options. Financial options confer the legal right to buy or sell a specific asset at a predetermined rate at a prespecified time, though the option holder has no obligation to do so. For example, a firm may purchase the financial option to buy 1 million gallons of oil at \$1 a gallon 3 months from now. If, in 3 months, the market price of oil is above \$1, the firm will exercise the option and pay the million dollars to obtain the million gallons of oil. However, if the market price is below \$1, the firm will allow the option to expire and instead purchase the million gallons of oil on the open market. Thus, by holding an option, a firm may capture upside swings from market uncertainty yet avoid losses.

Myers (1977) noted that, similarly, current sunk investments often provide future discretionary opportunities. The firm’s initial investment in, say, a research laboratory, can be viewed as a sort of option premium. If conditions later prove favorable, the option may be exercised through additional expenditures on, say, the development and marketing of specific products that were discovered through the efforts of the research laboratory. On the other hand, if favorable opportunities do not arise, the option may simply be allowed to expire—the firm is not required to make further investments toward the development and marketing of any products. Thus, when an initial investment in a “real” asset confers the right but not the obligation to take further action in the future, it possesses some basic optionlike characteristics.

In the few decades since Myers (1977) first expounded on the concept of “real options,” many scholars and practitioners have published a great many articles and texts on the topic (e.g., Amram & Kulatilaka, 1999; Dixit & Pindyck, 1994; Kensinger, 1987; Kester, 1984; Kogut & Kulatilaka, 1994; Luehrman, 1998; McGrath, 1997; Trigeorgis, 1996). Although the interested reader may refer to these articles for more detailed analysis, the basic idea is that in an uncertain world, the opportunity to wait before making irreversible investments has value. The longer a firm can “keep its options open,” the more information it can gather about possible future states. If, with the benefit of the passage of time, an investment opportunity appears favorable, the investment may

be “exercised,” wherein additional investments are made to capture profit potential. On the other hand, if time shows the project to be headed for failure, because no commitment has been made, the investor makes no further investments, losing only the sunk cost of the option. Thus, downside losses are contained. “The worst the investor can do is not exercise and receive, effectively, a payment of 0 for holding the option” (Kogut & Kulatilaka, 1994, p. 53). The more uncertain the environment, the more valuable the option, because once the option gets the investor’s foot in the door, upside gain potential rises with uncertainty, whereas loss is avoidable simply by opting to abandon the project.

By framing uncertainty as an opportunity rather than a threat, and essentially offering the promise of gain without risk, the real options approach has spread “from Wall Street to Main Street” (Amram & Kulatilaka, 1999, p. 47), turning into a “revolution” (Coy, 1999) that is supplanting traditional project evaluation techniques. Long-established discounted cash flow techniques have overlooked the value of flexibility by viewing capital investments as one-time “go/no-go” decisions. Projects are valued as if all cash flows are unchangeable. However, projects often unfold over many years, even decades. To assume that management will remain passive as the future unfolds is, in nearly all imaginable cases, unrealistic as well as undesirable. A real options approach places a value on management’s potential to avoid unnecessary losses and exploit emerging opportunities (Edelson, 1994; Kensinger, 1987; Trigeorgis, 1996).

Much of the early literature on real options involved the application of complicated mathematical formulas to individual projects to derive a dollar value for the degree of flexibility afforded active management by a particular real option (Majd & Pindyck, 1987; Myers & Majd, 1990; Trigeorgis & Mason, 1987). Realizing that a single capital project often creates not a single option, but a collection of options, real options research then moved toward the study of multiple options on a single project (Kogut & Kulatilaka, 1994; Myers, 1987; Trigeorgis & Mason, 1987). In recent years, the real options approach has moved beyond the valuation of individual projects based on their inherent flexibility, to now promoting real options thinking as a normative framework for corporate strategy.

Under a real options approach, the firm is viewed as a bundle of options, and strategy entails the management of this evolving bundle (Bowman & Hurry,

1993; Luehrman, 1998; Trigeorgis, 1996). A real options approach “says that when the future is highly uncertain, it pays to have a broad range of options open” (Coy, 1999, p. 118). If a firm has its bases covered with options, as an uncertain future unfolds, managers have the flexibility to frequently readjust course to maintain environmental fit. Of course this also means that many projects will be undertaken that must later be “extinguished ruthlessly” (McGrath, 1999, p. 23). So long as some projects pay off in big ways, whereas the costs of unsuccessful projects are minimized, then from a real options approach, a “high failure rate can even be positive” (McGrath, 1999, p. 16).

Unfortunately, though, failed projects carry organizational baggage—when a project fails, its project champion and others involved with the project also fail. The initial lack of commitment inherent in treating developing projects as options influences their likelihood of failure. A series of failures can cause a firm’s stakeholders to question the firm’s viability and perhaps even withdraw their support. In short, there are a variety of maladies associated with such an approach to strategy. The real options literature has not thoroughly explored the organizational implications of managing a firm as if it were a bundle of real options.

ORGANIZATIONAL IMPLICATIONS OF A REAL OPTIONS APPROACH

Amram and Kulatilaka (1999, p. 210) noted in the last paragraph of their book, *Real Options*, “In general, to capture the value of real options, organizations must be more flexible, take more risks, start a lot more projects, and kill a lot of projects.” Although the real options approach has thoroughly discussed the benefits of increased organizational flexibility, it has not explored what happens to an organization when it increases flexibility by altering its nature in such ways—increasing the level of risk undertaken, the number of projects begun, as well as the number of projects terminated. Although the intent of a real options approach is to increase the long-term stability of the firm by increasing variety in the face of uncertainty, paradoxically, such an approach can send signals to critical members of a firm’s internal and external environment that eventually bring about greater instability.

Internal Effects

In an exploratory survey of British finance officers, Busby and Pitts (1997) found that although many firms made use of options logic in their investment decisions, “The view that flexibility and options were beneficial qualities, *ceteris paribus*, was challenged” (Busby & Pitts, 1997, p. 179). Behavioral and organizational issues must also be considered. In particular, managing a firm as if it were a bundle of options can have detrimental effects on critical employee and management behaviors, increase organizational complexity beyond manageable levels, and lead to a loss of focus and control.

Highly motivated champions are often essential to push new projects past the many hurdles they face (Burgelman, 1983). If champions, as well as other critical personnel, do not believe that a firm has yet placed its full faith in a project, they will be less willing to whole-heartedly devote themselves to the project (Brunsson, 1990). Indeed, respondents to Busby and Pitts’s (1997, p. 184) survey relayed that “having options is not uniformly welcome since they may interfere with the commitment of the workforce to the firm’s plans.” Any project openly touted as an option signals a lack of organizational commitment. The firm is declaring that it will wait and see how events unfold before fully committing essential resources, making only small investments along the way to keep the option open, while reserving the right to back out at any time. In an odd twist, creating an option to maintain flexibility can then limit flexibility by decreasing the likelihood that multiple potential choices will remain viable over time. In a situation like that encountered by the assistant professor in this article’s opening quote, the choice of not committing in one time period destroys the opportunity to commit in a later time period.

These detrimental effects are only amplified when an entire firm is treated as a bundle of options. The type of highly flexible organization prescribed by a real options approach involves higher costs, can increase employee stress, and can foster a lack of focus (Das & Elango, 1995). Many of the additional costs of flexibility are incorporated into the option premium computed from most real option formulas. For example, if a firm wishes to maintain the option to expand its factory, it may purchase additional acres around its current site. The cost of obtaining and holding these

additional acres is the price of the option. Less obvious, and often overlooked, are the below-the-surface costs of increased stress and lack of focus.

Highly flexible organizations are designed to behave more like a collection of entrepreneurs than as a hierarchy. Most people, though, are not comfortable with the uncertainty of entrepreneurship, instead preferring the stability of hierarchy (Sennett, 1998). The constant uncertainty and change inherent in an options-oriented firm may prove too much for some. Firms "may have to lose otherwise highly productive employees who are unable to cope with high-flexibility work demands" (Das & Elango, 1995, p. 66). For those employees who remain, the resulting stress can manifest itself, at the extreme, through a threat-rigidity response (Staw, Sandelands, & Dutton, 1981) or more subtly in the form of higher turnover rates, absenteeism, or lack of organizational citizenship behavior. Option value is not realizable in the absence of alert and active involvement (Edelson, 1994; Kensinger, 1987; Trigeorgis, 1996; Trigeorgis & Mason, 1987), and so such responses are anathema to a successful real option approach to strategy.

As the number of options increases, it also becomes more difficult to control the firm. Unlike the analogous financial option, a firm generally cannot obtain the flexibility afforded by a real option through formal contract. In the face of competition, a firm must engage in a significant and ongoing process of continuous resource allocation decisions to maintain favorable access to a nonexclusive future state (Barnett, 1999). If a firm does not continuously monitor and act on emerging real option opportunities, competitors will quickly erode any potential option value (Bowman & Hurry, 1993). Given that managerial capacity is limited (Penrose, 1959), the efforts expended on forging option potential can detract from day-to-day operations and can even open a window of vulnerability that makes a firm susceptible to competitive attack (Grubb & Lamb, 2000). Instead, "it might be more economical to forego flexibility and reduce the organizational problem to one of controlling a 'one shot' communication on the desirability of investment, leading to an 'invest now or never' decision context" (Stark, 1996, p. 2). Thus, even though a real option may entail a small marginal financial cost, it may add significant organizational complications that exceed its marginal value.

In a case study of Shell Oil, Kemna (1993) found that increasing the number of options significantly increased organizational complexity yet added little

value. Given that oil is a commodity with a readily determinable market value, and so is one of the easiest settings in which to apply option analysis (see Amram & Kulatilaka, 1999), Kemna's findings are quite telling. More recently, Reuer and Leiblein's (2000) empirical study countered Kogut's (1991) suggestion that international joint ventures be viewed as real options owing to the operational flexibility they provide. Reuer and Leiblein found that the addition of such options increased organizational complexity beyond a manageable level, leading to many missed opportunities for management intervention.

It is the fear of missed opportunities that has, in large part, fueled the fervor surrounding the real options approach to strategy. This same fear can lead to unfocused and far-ranging investments. In arguing the merits of a real options approach, Kester (1984, p. 160) quoted a top executive who stated, "You simply can't put a dollar sign on a technological future that may have a tremendous payoff." Under such logic, it is harder to justify restraint than to justify the acquisition of option positions to hedge all possible future states. In fact, some authors note that in comparison to the real options approach, the traditional capital budgeting measure of return on investment (ROI) stands for "restraint on innovation" (ROI) (Faulkner, 1996). In contrast, "any rational manager facing uncertainty would seek to acquire every conceivable strategic option the firm could possibly use in responding to uncertain events" (Sanchez, 1993, p. 259).

The real options literature is by no means blind to the direct costs of acquiring option positions, and so does not prescribe unbounded flexibility. However, as a result of glossing over some of the organizational effects of acquiring and abandoning myriad projects while emphasizing the risks of lockout, real options reasoning can tempt managers to diversify beyond their managerial capacity. The farther a firm spreads its bets, the greater the likelihood of wandering outside its competencies (Das & Elango, 1995; Ghemawat, 1991). The real option approach's expectation and acceptance of high rates of failure (e.g., McGrath, 1999) only exacerbates the temptation toward far-ranging project investments.

External Effects

A firm is an open system embedded within a social environment (Granovetter, 1985; Katz & Kahn, 1966;

Scott, 1981). Its actions send signals that are interpreted not only by its internal employees and managers but also by stakeholders in this broader social environment (Freeman, 1984). These stakeholders observe firm behavior and can exert pressure on the firm to act in specific ways to maintain their support (Pfeffer & Salancik, 1978; Suchman, 1995). The real options literature has yet to address how an option approach can affect a firm's external perceptions. However, extrapolating from several prominent organizational theories, we can see that the behaviors prescribed by a real options approach—increased flexibility, more risk, greater numbers of projects undertaken, and greater numbers of failed ventures—can weaken a firm's relationship with external stakeholders.

Reputation is the salient characteristic that external observers ascribe to a firm (Fombrun & Shanley, 1990). Observers determine a firm's reputation by examining its prior actions, and use this as a basis for predicting its future behavior. Once formed, a reputation tells observers "what a company is, what it does, and what it stands for" (Fombrun, 1998, p. 476). A favorable reputation allows a firm to charge premium prices and sustain above-average returns (Fombrun, 1996).

It can be difficult for an options-oriented firm to maintain a favorable reputation. When a firm holds the option to pursue a multitude of directions, observers are uncertain of what previous actions indicate for the future behavior of that firm. Moreover, when a project is "extinguished ruthlessly" (McGrath, 1999, p. 23), its demise can reflect negatively on other firm assets. For example, a firm's solid brand name provides a sort of option platform (Kogut, 1991) that can be leveraged to more easily expand into new product lines. However, if a firm later drops any of these product extensions, "such action might be interpreted by customers as signaling problems with continuing goods" (Busby & Pitts, 1997, p. 180).

A multitude of discontinued projects can damage a firm's long-term reputation with stakeholders. Although the benefit of an option approach is that large sunk investments are often delayed, it still is necessary to make many smaller irreversible investments to create and hold an option position (Amram & Kulatilaka, 1999). Many of these investments are in the form of ties initiated between the firm and external parties. For example, a firm must forge links to suppliers and customers to develop and test market a new product, or with communities and government officials to free up potential new plant locations, or even with other firms to pursue joint ventures. These par-

ties can expend significant resources in planning and coordination and also make asset-specific investments to hold the option. Although established as tentative, these relationships can create expectations, especially if maintained over time. If an option-oriented firm severs the majority of its ties, it can develop an unfavorable reputation with potential suppliers, partners, and other external parties. These parties may recoup many of the direct costs by contract, but a sort of reputational spillover accumulates that decreases their willingness to take chances on that firm's later ventures (Fombrun, Gardberg, & Barnett, 2000).

According to the organizational ecology perspective, firm survival is enhanced not through starting and stopping a multitude of projects but through actions that exhibit reliability and accountability, thus fostering inertial tendencies (Hannan & Freeman, 1977, 1984). Especially in highly uncertain environments, where the real options approach is said to be most applicable, it may be better to lock in to a specialized course of action rather than pursue a real options strategy of covering one's bases. "When the environment changes rapidly among quite different states . . . these organizations will spend most of their time and energies adjusting structure" (Hannan & Freeman, 1977, p. 953). Each change consumes organizational resources and recreates the firm's "liability of newness" (Stinchcombe, 1965), thereby exposing the firm to renewed risk of failure (Amburgey, Kelly, & Barnett, 1993).

Institutional theory further posits that a firm improves its survival prospects by engaging in commonly acceptable behaviors (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott, 1981; Zucker, 1987). Firms gain and maintain legitimacy by conforming to the institutional "rules of the game" (North, 1990). As a result, firms become isomorphic over time. Stepping away from the pack threatens legitimacy and so places a firm at increased risk of failure (Baum & Oliver, 1991, 1992; Carroll & Hannan, 1989; Oliver, 1991; Scott, 1987). By encouraging a firm to invest in a more diverse range of possibilities, a real options approach increases the potential that a firm will stray from the pack. Of course "being different" increases profit potential, but it also threatens a firm's legitimacy (Deephouse, 1999).

Finally, an option-oriented firm can be a frequent target for competitive attack. Whereas a real options perspective examines the value of keeping options open, game theory sees value in credible commit-

ments that close options. Commitment signals a willingness to fight, thereby creating a barrier that deters competitive entry (Tirole, 1988). Several scholars have augmented real options models to account for investment timing decisions under competition, that is, when to make a large sunk investment given the possibility of competitive preemption (e.g., Dixit & Pindyck, 1994; McDonald & Siegel, 1986). However, these models primarily address individual project investment decisions. When an entire firm is treated as a bundle of options, it is more difficult to establish an obvious pillar of strength such that individual commitments will deter competitors from further attack.

DISCUSSION

A real options approach to strategy fosters flexibility, but it can also create turmoil. To amply hedge an uncertain future, a firm must create a large portfolio of tentative projects. To make this approach cost-effective, those projects that do not appear to meet a market demand must quickly be abandoned. However, "abandonment is seen as defeatist" (Busby & Pitts, 1997, p. 180). It can signal to employees a lack of organizational support, to partners a lack of resolve, to competitors a lack of core strength, and to the broader institutional environment a lack of reliability and accountability.

Consider Xerox. Xerox serves as a famous example of a firm that can be said to have suffered much-of the turmoil of an options type of approach. In 1970, flush with monopoly profits from the copier market, Xerox commissioned its much-heralded research arm, the Palo Alto Research Center (PARC), to develop projects that would ensure Xerox's technological leadership well into the future. Within a decade, PARC developed graphical user interfaces, mouse devices, windows and pull-down menus, laser printing, distributed computing, and the Ethernet (Port, 1997). Although PARC's talented scientists created all these path-breaking technologies, Xerox marketed few of them. Xerox corporate headquarters, mired in an analog mentality, simply had no idea what to do with all the new digital ideas. The internal turmoil led to high turnover. "Many of the scientists, after realizing that Xerox was allowing their inventions to languish, walked out to start their own companies" (Pitta, 1995, p. 4). Moreover, the series of missed opportunities fostered external perceptions that Xerox was a poorly managed firm. The early experiences of Xerox PARC

have been labeled "one of the biggest blunders in corporate history" (Anthes, 1998, p. 74). Xerox has been criticized for *Fumbling the Future* (Smith & Alexander, 1988) and is best known not for developing many technologies that went on to change the world but rather for its mismanagement of their marketing (Beckett, 1998; Grimes, 1998; Serwer, 1999). Instead of positioning Xerox for long-term success, the flexibility created through the projects forged at Xerox PARC only brought Xerox's reputation into question. In short, Xerox paid a hefty price to hold a set of real options it could not effectively exercise.

Figure 1 illustrates the double edge of flexibility. A real options approach can prove very valuable for firms facing uncertain environments. By uncovering option value, worthwhile projects that might have otherwise fallen to the wayside may be supported (Hayes & Abernathy, 1980; Hayes & Garvin, 1982). Owing to the knowledge, capabilities, and connections gained from investment in current real options, doors may be opened to future projects (Fombrun et al., 2000). And of course firms with multiple viable options can more easily adjust to changing future circumstances, providing current benefits as well in the form of lower risk premiums (Chatterjee, Lubatkin, & Schulze, 1999).

However, as a firm expands into areas unrelated to its current strengths, its marginal gains and even overall profitability tend to decline (Prahalad & Bettis, 1986; Rumelt, 1982; Teece, 1980). As bets are spread across a wider range of potential outcomes to hedge against lockout, errors of omission may start to outweigh errors of commission, and the firm may start to lose focus (Das & Elango, 1995). "Too many unrelated options oriented projects and a firm can come to find it has neither the resources nor the energy to capitalize on these options" (McGrath & Dubini, 1999, p. 27). Project champions may be hesitant to devote ample time and effort to high-risk, contingent projects (Brunsson, 1990), and even if motivated to do so, may have great difficulty garnering critical resources to sustain projects that diverge from corporate strengths and threaten historical power bases (Burgelman, 1983; Dougherty & Heller, 1994).

Observers may find the organization unpredictable, and employees may find the uncertainty intolerable (Sennett, 1998). Customers may lose interest in a firm that repeatedly discontinues product lines or fails to deliver on earlier promoted items (e.g., vaporware). Suppliers may become unwilling to work with a firm that frequently changes its requirements.

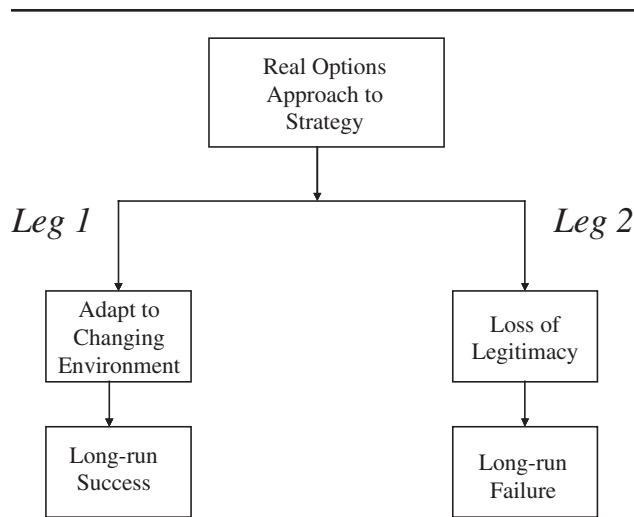


Figure 1: The double edge of a real options approach to strategy

Rather than praise the high flexibility of the firm, investors may assume poor management oversight and perceive the start of a downward spiral. Reliability is diminished and reputation is tarnished. Over time, legitimacy may be lost and survival threatened (Amburgey et al., 1993). Thus, an options orientation can ensure a firm adapts to changing environments and so succeeds in the long run (Leg 1), but can also push a firm toward loss of legitimacy and eventual failure (Leg 2).

The switch from successful use of flexibility (Leg 1) to loss of legitimacy (Leg 2) is a function, then, of the perceptions of internal and external stakeholders. Organizational changes such as the abandonment of developing projects may be viewed positively or negatively by stakeholders, and thus may or may not lead to loss of legitimacy and the onset of organizational decline. There is often a fine line between perceptions of rational adjustment to changing circumstances and lack of foresight owing to poor management. As Garud and Van de Ven (1992) found, a change in plans to safeguard against threats is likely to result in a negative assessment of past performance, whereas a change in plans to capitalize on opportunities is likely to result in a positive assessment of past performance. Thus, if stakeholders perceive that changes are undertaken in a proactive fashion, not out of necessity owing to poor project planning or execution, then the firm will more likely be perceived in a favorable light.

A firm may prevent such a switch—that is, continue fruitfully down Leg 1 of the mode—by effectively managing stakeholder perceptions, both through symbolic and substantive actions. Communication can

improve some stakeholder relationships, and perhaps provide a firm with the benefit of the doubt for a period of time. Realizing its missteps, Xerox began to stem the tide of bad publicity caused by its notorious “fumbles” by making a large showing at the 1998 annual computer industry convention, Comdex. Noting that Comdex was “quite an opportunity to change a lot of perceptions” (Grimes, 1998, p. B7), Xerox addressed previous mistakes head-on and pushed the idea that it was not just a copier company but also an innovator.

However, a firm cannot suffer a great many failed projects and then be bailed out solely by slick public relations. Substantive changes such as organizational redesign are critical to profiting from a real options approach (Kumaraswamy, 1996). Given the difficulty of pushing new ideas past entrenched organizational interests (Burns & Stalker, 1967), it may be necessary, for example, to establish separate venture units to pursue new product ideas (Galbraith, 1982; Hlavacek & Thompson, 1973). Noting that PARC “often hatches potent ideas for which Xerox has no ready use” (Port, 1997, p. 98), Xerox created a new unit called Xerox New Enterprises to spin off these promising advances (Beckett, 1998; Port, 1997). Such a design was intended to allow PARC researchers to dream up new ideas without becoming frustrated when Xerox itself could not exploit them.

CONCLUSION

When the field of management first imports the tools of other disciplines to solve difficult strategic problems, it often applies them outside their appropriate domain (Montgomery, Wernerfelt, & Balakrishnan, 1989). It appears that this may be the case once again. The real options framework is being prescribed at the firm level as a means of modeling overall corporate strategy (Bowman & Hurry, 1993; Luehrman, 1998; Trigeorgis, 1996), whereas the current state of the art remains best suited for project-level financial evaluation. As a stand-alone project-evaluation technique, the real options approach holds great merit and is a tremendous improvement over static discounted net present value techniques. When the strict financial logic of options theory is extended across an entire organization, however, many complications arise. A real options approach to corporate strategy tends to overlook the critical role of commitment in sustaining organizational legitimacy with internal and external stakeholders. When only a few

of a firm's key projects are treated as optional, the firm may amply muster the support of critical parties. However, if the entire firm is managed as if it were a bundle of options, a sort of "culture of contingency" sets in that can degrade relationships with employees, loosen the discipline of management, and decrease the reliability of the firm in the eyes of external stakeholders. In short, real option methodology is an excellent tool to help managers identify the valuable flexibility inherent in current and potential projects but is oversold as a means of creating flexibility across a firm.

Real option methods are becoming increasingly complex and can now capture a variety of factors that influence the value of flexibility created by contingent projects (e.g., Brennan & Trigeorgis, 2000). Nonetheless, they are not ample to capture the complex organizational dynamics involved with treating the entire firm as a bundle of real options. Given that so many inputs to such formulas are subjective for all but a small subset of assets (e.g., "close to market" commodities; Amram & Kulatilaka, 1999), it seems unlikely that they ever will. Indeed, "quantitative models for valuing these kinds of options are almost impossible to apply in practice, since truly strategic options are so vague and often depend on a manager's vision of what might happen" (Barwise, Marsh, & Wensley, 1987, p. 5). It seems particularly implausible for a firm to quantitatively assess how a real options approach will influence its relationships with internal and external stakeholders. Managers may not need precise mathematical formulas to properly manage a firm as if it were a bundle of options—close approximations may work quite well (Amram & Kulatilaka, 1999; Luehrman, 1998). However, they do need to account for the more subtle social factors that may harm an options-oriented firm over time.

A strategic approach that strives to enable a firm to hedge its potential future states entails both financial costs, as addressed in prior literature, and social costs, which I explored in this article. Firms should take a close look at the total costs as well as the potential benefits of a real options approach to strategy. As Tegarden, Hatfield, and Echols (1999) discovered, technological lockout does not necessarily doom a firm to failure. In other words, the fear of lockout that has driven much of the fervor behind the real options approach may be overstated. Many options obtained under this threat may not be worth maintaining once the ominous shadow of permanent lockout is removed.

As the vast literature on diversification has taught us, straying too far from one's core strengths tends to increase organizational complexity and costs beyond any additional income it may generate (Prahalad & Bettis, 1986; Rumelt, 1982; Teece, 1980). Given an enlightened perspective on the financial and organizational costs of maintaining an option, and the apparently less-than-infinite harm of not holding an option on all possible future states, this appears to be the case with real options as well (Kemna, 1993; Reuer & Leiblein, 2000). Because the firm will be able to better assess their value, properly maintain them, and exercise them effectively, options worth holding are likely to be those related to a firm's current resource base.

Capabilities have been treated as real options (Kogut & Kulatilaka, 1999), but scholars would be well served to also consider real options as capabilities. That is, the effective use of options methods is not a trivial exercise in hedging but rather an involved process much more akin to creating and sustaining organizational capabilities (Barnett, 1999). As such, a firm should concentrate its efforts on the limited range of options that it can effectively handle. By taking on fewer and more related options, and devoting more effort to each option, fewer options will eventually need to be "ruthlessly extinguished," and so the firm will suffer less trauma to its internal and external relationships.

Each firm has a different internal ability to deal with the vagaries of an increasingly flexible strategic posture and faces unique environmental contingencies that favor differing levels of flexibility over time. Thus, each firm at each point in time has a different capacity to employ real options. Future research should attempt to operationalize a firm's option "carrying capacity"—how much is too much? This is not an easy task, as optimal flexibility is dynamic, varying by firm and over time. Although a firm may extend its carrying capacity through public relations and organizational restructuring, such methods do not allow a firm to reach far beyond its current strengths, as the case of Xerox attests. Despite the aforementioned promotional and reorganization efforts Xerox used to better manage the many options generated by PARC, PARC apparently proved too divergent from Xerox's core and so was spun off in January 2002.

Future research should further explore specific internal and external factors that set off the chain reactions that can push flexible firms down the path of loss of legitimacy. Recognizing the difficulty in achieving optimality, it is also important to uncover the most effective means of correcting excess flexibility. To what

degree can communication preserve favorable stakeholder relationships despite heavy reliance on real options? What methods of restructuring may be necessary, and when and how should they be undertaken? By more thoroughly addressing important issues such as these, we can increase the likelihood that firms will enjoy the benefits of strategic flexibility without "falling off the fence."

NOTE

1. To describe an asset or capability as valuable, one must believe it will have market value beyond the short term. Nonetheless, this is a subjective estimate and prone to failure in an uncertain environment.

REFERENCES

- Amburgey, T. L., Kelly, D., & Barnett, W. P. (1993). Resetting the clock: The dynamics of organizational change and failure. *Administrative Science Quarterly*, 38, 51-73.
- Amram, M., & Kulatilaka, N. (1999). *Real options: Managing strategic investment in an uncertain world*. Boston, MA: Harvard Business School Press.
- Anthes, G. H. (1998, May 18). A walk in the parc. *Computerworld*, pp. 73-74.
- Arthur, W. B. (1989). Competing technologies, increasing returns, and lock-by historical events. *Economic Journal*, 99, 1161-1131.
- Barnett, M. L. (1999). *Paying attention to real options*. Paper presented at the Academy of Management Conference, Technology & Innovation Management Division, Chicago.
- Barney, J. B. (1986). Strategic factor markets: Expectations, luck, and the theory of business strategy. *Management Science*, 42, 1231-1241.
- Barwise, P., Marsh, P., & Wensley, R. (1987). Strategic investment decisions. *Research in Marketing*, 9, 1-57.
- Baum, J. A. C., & Oliver, C. (1991). Institutional linkages and organizational mortality. *Administrative Science Quarterly*, 36, 187-218.
- Baum, J. A. C., & Oliver, C. (1992). Institutional embeddedness and the dynamics of organizational populations. *American Sociological Review*, 57, 540-559.
- Beckett, J. (1998, June 4). No more flubs: Xerox vows to profit from technology innovations at PARC. *San Francisco Chronicle*, p. D1.
- Black, F., & Scholes, M. (1973). The pricing of options and corporate liabilities. *Journal of Political Economy*, 81, 637-659.
- Bowen, H. K., Clark, K. B., Holloway, C. A., & Wheelwright, S. C. (1994). Development projects: The engine of renewal. *Harvard Business Review*, 92(5), 110-120.
- Bowman, E. H., & Hurry, D. (1993). Strategy through the option lens: An integrated view of resource investments and the incremental choice process. *Academy of Management Review*, 18(4), 760-782.
- Brennan, M. J., & Trigeorgis, L. (Eds.). (2000). *Project flexibility, agency, and competition*. New York: Oxford University Press.
- Brown, S. L., & Eisenhardt, K. M. (1998). *Competing on the edge: Strategy as structured chaos*. Boston, MA: Harvard Business School Press.
- Brunsson, N. (1990). Deciding for responsibility and legitimation: Alternative interpretations of organizational decision-making. *Accounting, Organizations and Society*, 15(1/2), 47-59.
- Burgelman, R. A. (1983). A process model of internal corporate venturing in the diversified major firm. *Administrative Science Quarterly*, 28, 223-244.
- Burns, T., & Stalker, G. M. (1967). *The management of innovation*. London: Tavistock.
- Busby, J. S., & Pitts, C. G. C. (1997). Real options in practice: An exploratory survey of how finance officers deal with flexibility in capital appraisal. *Management Accounting Research*, 8, 169-186.
- Carroll, G. R., & Hannan, M. T. (1989). On using institutional theory in studying organizational populations. *American Sociological Review*, 54(4), 545-548.
- Chatterjee, S., Lubatkin, M. H., & Schulze, W. S. (1999). Toward a strategic theory of risk premium: Moving beyond CAPM. *Academy of Management Review*, 24(3), 556-557.
- Conner, D. R. (1993). *Managing at the speed of change: How resilient managers succeed and prosper where others fail*. New York: Villard Books.
- Coy, P. (1999, June 7). Exploiting uncertainty: The "real options" revolution in decision-making. *Business Week*, 118-124.
- Das, T. K., & Elango, B. (1995). Managing strategic flexibility: Key to effective performance. *Journal of General Management*, 20(3), 60-75.
- D'Aveni, R. A. (1994). *Hypercompetition: Managing the dynamics of strategic maneuvering*. New York: Free Press.
- David, P. (1985). Clio and the economics of QWERTY. *American Economic Review*, 75, 332-337.
- Davis, S., & Meyer, C. (1998). *Blur: The speed of change in the connected economy*. Cambridge, MA: Perseus.
- Deephouse, D. L. (1999). To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20, 147-166.
- Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35(12), 1504-1511.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 147-160.
- Dixit, A. (1992). Investment and hysteresis. *The Journal of Economic Perspective*, 6(1), 107-132.
- Dixit, A., & Pindyck, R. (1994). *Investment under uncertainty*. Princeton, NJ: Princeton University Press.
- Dougherty, D., & Heller, T. (1994). The illegitimacy of successful new products in large firms. *Organization Science*, 5, 200-218.

- Edelson, M. E. (1994). *Real options: Valuing managerial flexibility* (Harvard Business School Case No. 9-294-109). Boston, MA: Harvard Business School Publishing.
- Faulkner, T. W. (1996). Applying "options thinking" to R&D valuation. *Research Technology Management*, 39(3), 50-56.
- Fombrun, C. J. (1996). *Reputation: Realizing value from the corporate image*. Cambridge, MA: Harvard Business School Press.
- Fombrun, C. J. (1998). Reputation. In N. Nicholson (Ed.), *Blackwell encyclopedic dictionary of organizational behavior* (pp. 476-478). Malden, MA: Blackwell.
- Fombrun, C. J., Gardberg, N. A., & Barnett, M. L. (2000). Opportunity platforms and safety nets: Corporate citizenship and reputational risk. *Business and Society Review*, 105(1), 85-106.
- Fombrun, C. J., & Shanley, M. (1990). What's in a name? Reputation-building and corporate strategy. *Academy of Management Journal*, 33, 233-258.
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston: Pitman.
- Galbraith, J. (1982). Designing the innovating organization. *Organizational Dynamics*, 10(3), 5-25.
- Garud, R., Kumaraswamy, A., & Nayyar, P. (1998). Real options or fool's gold? Perspective makes the difference. *Academy of Management Review*, 23(2), 212-217.
- Garud, R., & Van de Ven, A. H. (1992). An empirical evaluation of the internal corporate venturing process. *Strategic Management Journal*, 13, 93-109.
- Ghemawat, P. (1991). *Commitment: The dynamic of strategy*. New York: Free Press.
- Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91, 481-510.
- Grimes, C. (1998, November 16). Xerox hoping to shift image at trade show—Plans big push at Comdex to project that it is an innovative company. *The Wall Street Journal*, p. B7.
- Grove, A. S. (1996). *Only the paranoid survive: How to exploit the crisis points that challenge every company and career*. New York: Currency/Doubleday.
- Grubb, T. M., & Lamb, R. B. (2000). *Capitalize on merger chaos: Six ways to profit from your competitors' consolidation and your own*. New York: Simon & Schuster.
- Hannan, M. T., & Freeman, J. (1977). The population ecology of organizations. *American Journal of Sociology*, 83, 929-984.
- Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review*, 49, 149-164.
- Hayes, R., & Abernathy, W. (1980). Managing our way to economic decline. *Harvard Business Review*, 58(4), 66-77.
- Hayes, R., & Garvin, D. (1982). Managing as if tomorrow mattered. *Harvard Business Review*, 60(3), 71-79.
- Hlavacek, J., & Thompson, V. (1973). Bureaucracy and new product innovation. *Academy of Management Journal*, 16, 361-372.
- Katz, D., & Kahn, R. L. (1966). *The social psychology of organizations*. New York: John Wiley.
- Kemna, A. (1993). Case studies on real options. *Financial Management*, 22, 259-270.
- Kensinger, J. W. (1987). Adding the value of active management into the capital budgeting equation. *Midland Corporate Finance Journal*, 5(1), 31-42.
- Kester, W. C. (1984). Today's options for tomorrow's growth. *Harvard Business Review*, 62, 153-160.
- Kogut, B. (1991). Joint ventures and the option to expand and acquire. *Management Science*, 37, 19-33.
- Kogut, B., & Kulatilaka, N. (1994). Options thinking and platform investments: Investing in opportunity. *California Management Review*, 36(2), 52-71.
- Kogut, B., & Kulatilaka, N. (1999). *Capabilities as real options*. Wharton School Working Paper, Philadelphia.
- Kumaraswamy, A. (1996). *A real options perspective of firms' R&D investments*. Unpublished doctoral dissertation, New York University.
- Lawrence, P. R., & Lorsch, J. W. (1967). *Organization and environment*. Cambridge, MA: Harvard University Press.
- Luehrman, T. (1998). Strategy as a portfolio of real options. *Harvard Business Review*, 76, 89-99.
- Majd, S., & Pindyck, R. (1987). Time to build, option value, and investment decisions. *Journal of Financial Economics*, 18, 7-27.
- McDonald, R., & Siegel, D. (1986). The value of waiting to invest. *Quarterly Journal of Economics*, 101(4), 707-727.
- McGrath, R. G. (1997). A real options logic for initiating technology positioning investments. *Academy of Management Review*, 22(4), 974-996.
- McGrath, R. G. (1999). Falling forward: Real options reasoning and entrepreneurial failure. *Academy of Management Review*, 24(1), 13-30.
- McGrath, R. G., & Dubini, P. (1999). *Option potential and the innovator's dilemma: Resource commitment to uncertain new projects*. New York: Columbia University.
- Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83, 340-363.
- Miller, D. (1990). *The Icarus paradox*. New York: HarperCollins.
- Montgomery, C. A., Wernerfelt, B., & Balakrishnan, S. (1989). Strategy content and the research process: A critique and commentary. *Strategic Management Journal*, 10, 189-197.
- Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5, 147-175.
- Myers, S. C. (1987). Finance theory and financial strategy. *Midland Corporate Finance Journal*, 5(1), 6-13.
- Myers, S. C., & Majd, S. (1990). Abandonment value and project life. *Advances in Futures and Options Research*, 4, 1-21.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge, UK: Cambridge University Press.
- Oliver, C. (1991). Strategic responses to institutional processes. *Academy of Management Review*, 16(1), 145-179.
- Penrose, E. (1959). *The theory of the growth of the firm*. New York: Oxford University Press.
- Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective*. New York: Harper & Row.
- Pitta, J. (1995, September 13). Who and what made PARC an industry legend. *Los Angeles Times*, p. 4.
- Port, O. (1997, September 29). Xerox won't duplicate past errors. *Business Week*, p. 98.
- Porter, M. E. (1980). *Competitive strategy*. New York: Free Press.

- Prahalad, C. K., & Bettis, R. A. (1986). The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal*, 7, 485-501.
- Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 68, 79-91.
- Reuer, J. J., & Leiblein, M. J. (2000). Downside risk implications of multinationality and international joint ventures. *Academy of Management Journal*, 43(2), 203-214.
- Rumelt, R. P. (1982). Diversification strategy and profitability. *Strategic Management Journal*, 3, 359-369.
- Sanchez, R. (1993). Strategic flexibility, firm organization, and managerial work in dynamic markets: A strategic-options perspective. In P. Shrivastava, A. Huff, & J. Dutton (Eds.), *Advances in Strategic Management*, 9, 251-291. Greenwich, CT: JAI.
- Scott, W. R. (1981). *Organizations: Rational, natural, and open systems*. Englewood Cliffs, NJ: Prentice Hall.
- Scott, W. R. (1987). The adolescence of institutional theory. *Administrative Science Quarterly*, 32, 493-511.
- Sennett, R. (1998). *The corrosion of character: The personal consequences of work in the new capitalism*. New York: Norton.
- Serwer, A. (1999, September 29). Xerox PARC's wizards go back to the future. *Fortune*, p. 317.
- Smith, D. K., & Alexander, R. C. (1988). *Fumbling the future: How Xerox invented, then ignored, the first personal computer*. New York: William Morrow.
- Stark, A. W. (1996, June). Hurdle rates, the timing of capital expenditures and organizational issues. *Manchester Business School Research Newsletter*, 22, 1-2.
- Staw, B. M., Sandelands, L. E., & Dutton, J. E. (1981). Threat-rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly*, 26, 501-524.
- Stinchcombe, A. L. (1965). Social structure and organizations. In J. G. March (Ed.), *Handbook of organizations* (pp. 142-193). Chicago: Rand McNally.
- Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 29(3), 571-610.
- Teece, D. (1980). Economies of scope and the scope of the enterprise. *Journal of Economic Behavior and Organization*, 1, 233-247.
- Tegarden, L. F., Hatfield, D. E., & Echols, A. E. (1999). Doomed from the start: What is the value of selecting a future dominant design? *Strategic Management Journal*, 20, 495-518.
- Tirole, J. (1988). *The theory of industrial organization*. Cambridge, MA: MIT Press.
- Trigeorgis, L. (1996). *Real options: Managerial flexibility and strategy in resource allocation*. Cambridge, MA: MIT Press.
- Trigeorgis, L., & Mason, S. P. (1987). Valuing managerial flexibility. *Midland Corporate Finance Journal*, 5(1), 14-21.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.
- Zucker, L. G. (1987). Institutional theories of organization. *Annual Review of Sociology*, 13, 443-464.

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