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How Corporate Entrepreneurs Learn from Fledgling Innovation Initiatives: Cognition and the Development of a Termination Script

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Through a parallel examination of literatures on new product development termination and entrepreneurial cognition, this study explores a specific form of human capital development: learning from failure. Specifically we advance the literature on entrepreneurial human capital by linking cognitive scripts used by corporate entrepreneurs in project termination decisions to corresponding levels of learning. Our longitudinal investigation of technology-based firms suggests that corporate entrepreneurs use three types of termination scripts: (1) undisciplined termination, (2) strategic termination, and (3) innovation drift. We illustrate the presence of each script and analyze learning implications during innovation projects (action learning) and after termination (post-performance learning). Based on our analysis we suggest that organizational learning is dependent upon the type of termination script individuals employ.

Because of the strong impact that new product development has on the organization, the decision to proceed with or terminate a product development initiative is one of the most important but difficult decisions in corporate entrepreneurship (Balachandra, 1984; Green, Welsh, & Dehler, 2003). Product development initiatives may be ended too quickly, resulting in unrealized potential, or may be held on for too long, resulting in prolonged commitment to a losing course of action. This importance is underscored by the fact that failed new ventures can constrain a company's resources for decades and cost hundreds of millions of dollars (Balachandra, 1984; Boulding, Morgan, & Staelin, 1997; Royer, 2003).

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In addition, a large percentage—between 25% and 35% (Boulding et al., 1997)—of new product development efforts end in failure. In a 4-year study of new product development at Nokia, McGrath, Keil, and Tukiainen (2006) found that 70% of corporate venturing investments from 1998 to 2002 were either discontinued or completely divested. In response, there is an emerging research stream that focuses upon learning from failure (McGrath, 1999; McGrath et al. ; Minniti & Bygrave, 2001; Shepherd, 2003; Sitkin, 1992). It has been suggested that failure, specifically in the context of new product development and corporate entrepreneurship, provides valuable learning opportunities such as a greater emphasis on innovation processes, increased search for solutions, additional motivation for adaptation, greater attention to information processing, an increased risk tolerance, and greater experimentation (McGrath, 1999; Sitkin, 1992). However, we know very little about how corporate entrepreneurs make termination decisions and how they capitalize upon the potential learning from these failed initiatives.

To facilitate understanding, we turn to a cognitive perspective. In entrepreneurship, the cognitive perspective has gained strength over the past decade because it demonstrates the importance of an individual's knowledge structures to judgments and decisions involving opportunity evaluation, venture creation, and the successful growth of new ventures (Mitchell et al., 2002). The cognitive perspective is especially applicable to learning from failure, as the literature has shown that entrepreneurs are more likely to engage in decision-making biases and heuristics such as counterfactual thinking; attribution of positive outcomes to internal causes and negative outcomes to external causes; underestimation of the time required to complete a project; and self-justification for escalation of commitment (Baron, 1998; Busenitz & Barney, 1997; Forbes, 2005; Shaver, Gartner, Crosby, Bakalarova, & Gatewood, 2001; Staw, 1981). Of particular relevance to the study of failure is the research on cognitive scripts—the process of ordered mental steps pertinent to a particular action, activity, or field of interest (Read, 1987)—because scripts provide a theoretical framework from which to organize the seemingly disparate decisions made by corporate entrepreneurs (Mitchell, Smith, Seawright, & Morse, 2000).

In this study we explore the intersection between new product development failures and entrepreneurial cognition in order to acquire a deeper understanding of the processes associated with project termination and the resulting actions that may lead to increased organizational learning. As such, and as part of a larger research program that investigated how large corporations could build a sustainable capability for developing innovative new ventures, we explored the cognitive scripts used by corporate entrepreneurs to terminate failing new product development ventures. Additionally, we illustrate the presence of each script and analyze learning implications.

We focus on the role of the corporate entrepreneurs because corporate entrepreneurs are seen as critically important to the innovation process (Brown & Eisenhardt, 1995; Cooper, Edgett, & Kleinschmidt, 1999) as they make strategic choices concerning which markets to invest in, which projects to select, and how to allocate resources (Cooper et al.). In addition, the cognitions of the lead entrepreneur strongly affect the organization's belief about new product development (Royer, 2003).

This paper reports our iterative journey from our initial theoretical framework, through qualitative inquiry—a process of balancing theoretical discipline with openness to additional interpretation—to final theory building. We begin by exploring three research precedents (termination of new product development initiatives; failure as an opportunity to learn; and entrepreneurial cognition) that influenced our initial theorizing. Next, we explain our methodology and the 3-year longitudinal investigation of new product development in 11 of the world's largest technology-based firms. We then present our findings, which suggest that corporate entrepreneurs use three specific cognitive

scripts (undisciplined termination, strategic termination, and innovation drift) when making project termination decisions. Finally, we demonstrate how these scripts may lead to varying types and amounts of organizational learning. Based upon our analysis we define and detail how these findings contribute to understanding the role of human capital in technologically intensive corporate entrepreneurial settings.

Theoretical Development

Our theoretical development draws on three existing literature streams—(1) termination of new product development initiatives; (2) failure as an opportunity to learn; and (3) entrepreneurial cognition—as research precedents for our study.

Termination of New Product Development Initiatives

It is difficult to overestimate the value of new product development, especially in highly dynamic markets with increasing levels of competition, high technical obsolescence, and short product life cycles (Griffin, 1997). In the Product Development & Management Association's study of new product development best practices, Griffin (1997) found that 49% of firm sales came from products commercialized over the previous 5 years. However, new product development is an inexact science with a large percentage of new initiatives failing prior to launch. One of the first studies exploring new product development success rates indicates that approximately 33% of new product development initiatives fail (Booz, Allen, & Hamilton, 1968). Other research provides similar results, with Boulding et al. (1997) reporting a range of 25–35% as unsuccessful; Crawford (1979) reporting a failure rate of 36%; and both Page (1994) and Griffin (1997) reporting that 41% of new development initiatives are unsuccessful. Thus, even though a significant amount of research has focused on how to improve the product development process, the rate of failure in new product development initiatives has remained relatively stable over time.

Because at least one-third of new initiatives fail, a significant responsibility for corporate entrepreneurs is to understand new product development termination processes and how firms can learn from failed initiatives. According to Cooper et al. (1999), top performing product development firms place significant concern on having the right balance of projects and the right number of projects. In order to maintain this optimum balance of number and type of project, corporate entrepreneurs must make termination decisions regarding failing or poorly performing initiatives. Schmidt and Calantone (2002, p. 103) propose that ". . . projects that should have been abandoned during development sometimes proceed through commercialization only to fail in the market at substantially higher costs. . . ." Although the costs of failure are high, the real "failure" may be in not learning from previous failures and applying that knowledge to future initiatives (McGrath, 1999).

Failure as an Opportunity to Learn

Following McGrath's lead, we define failure as "the termination of an initiative that has fallen short of its goals" (1999, p. 14). Therefore, failure results when corporate entrepreneurs make the decision to terminate an ongoing new product development initiative. In his work concerning learning through failure, Sitkin (1992, p. 231) argues

that "failure is an essential prerequisite for effective organizational learning and adaptation." The old adage "grief is far too an important emotion to waste" seems applicable to failure. In a sense, failure is far too expensive to waste—especially when it encompasses one-third of new development initiatives!

McGrath (1999) argues that an anti-failure bias may lead to the loss of important lessons and result in unanticipated negative consequences such as misrepresentation of causal connections, competence traps, reduced incentive to take action, and defensive routines. Learning from failure in new product development allows organizations to "improve new product developments projects and avoid earlier made mistakes" (Harkema, 2003, p. 342). What then determines whether a firm has the ability to stop failing projects and learn from the failed process? Royer's (2003) study of failed internal new ventures like RCA's Selectavision (which lost the industry battle to the video cassette recorder) and Essilor's "next generation" bifocal lens suggests that an organization's failure to stop projects is often due to an individual-level cognition that develops into a general group belief. That is, the cognition of the corporate entrepreneur plays a critical role in decisions made throughout the new product development process.

Cognition in the Learning Process

Previous research indicates that cognition is important to understanding the continuation/termination decisions of the corporate entrepreneur. Researchers have argued for some time that an understanding of the mental processes of entrepreneurs will enable researchers to build a well-grounded foundation toward systematically explaining the individual's role within the process of entrepreneurship (Mitchell et al., 2002). These authors explain that "entrepreneurial cognitions are the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth" (p. 97). Here, we seek to extend this line of research by examining cognitions within the process of learning from failure.

Cognitive dimensions that have been related to termination decisions include perception of personal responsibility and commitment (Schmidt & Calantone, 2002); attribution bias (Forlani & Walker, 2003); championing (Markham, 2000); and advocacy and unobserved performance thresholds (Green et al., 2003). For example, Schmidt and Calantone (2002, p. 104) found that "managers who initiate a project are less likely to perceive it is failing, are more committed to it, and are more likely to continue funding it. . . ."

While we have learned a great deal from this previous research, Royer (2003) suggests that the difficulty in "killing bad projects" usually comes down to a more human impulse: an individual's desire to believe in something (the success of the new venture). She explains that organizations lose money persisting after new ventures that show classic signs of failure because of cognitive beliefs that begin at the individual level and move to the organizational level. "This sentiment [widespread belief in the new venture's *inevitable* success] typically originates, naturally enough, with a project's champion; it then spreads throughout the organization, often to the highest levels, reinforcing itself each step of the way. The result is what I call collective belief, and it can lead an otherwise rational organization into some very irrational behavior" (p. 6).

How then do corporate entrepreneurs make termination decisions and take advantage of the learning that could occur from these failed initiatives? Placing Royer's (2003) work, which highlights the importance of cognition to termination, alongside the work of Mitchell et al. (2000), which suggests that cognitive scripts are integral to new venture creation, provides an important theoretical foundation from which to study this question. Cognitive scripts, specifically ability scripts, refer to an individual's knowledge structures

concerning the capabilities, skills, and knowledge required to create a new venture (Mitchell et al.). "Ability scripts include the capability to assess the condition and potential of ventures, to draw on and apply lessons learned in a variety of ventures . . ." (p. 978); suggesting they may be important to the termination process and the ability to learn from that process. Ability scripts may include venture diagnostics, situational knowledge, and ability–opportunity fit (Mitchell et al.). However, the extant literature on expert scripts may not be applicable when uncertainty is high. Expert scripts develop over time from experience in a domain (Ericson, Krampe, & Tesch-Romer, 1993; Glaser, 1984), but these scripts may not lead to success when individuals are asked by their firm to develop new-to-the-world ventures. Conceptually, we argue for the need for a termination script to augment learning from the inevitable failure (Booz et al., 1968; Green et al., 2003; Page, 1994) of some new ventures. At some point during the practice of new venture development, corporate entrepreneurs must question whether what they thought was an opportunity would be realized as such. The work of Mitchell et al. identified that there are common scripts to the venture *creation* process. Using the work of Mitchell et al. as a starting point, we investigate the venture *termination* process and the learning that may result.

Methodology and Research Design

Qualitative inquiry is an iterative process that requires the balance of theoretical discipline in concert with openness to additional interpretation. Expanding theory to additional contexts, such as applying new venture knowledge to corporate settings, demands continuous communication between researchers as they toggle between successive rounds of data analysis and immersion in theory. We take a grounded theory approach with the purpose of elaborating on existing theory (Vaughan, 1992) in learning, cognition, and new product development. Strauss and Corbin (1998) dispel the misperception that the sole focus of grounded theory methodology is generating entirely new theory.

> In this methodology, theory may be *generated* initially from the data, or, if existing theories seem appropriate to the area of investigation, then these may be *elaborated* and modified as incoming data are meticulously played against them (p. 159).

Our process followed this accepted procedure, as broad theory initially guided our path into the data and then the data emerged in themes that brought us back to realize new insights into theory. In a recent Editor's Forum on qualitative research in the *Academy of Management Journal*, several authors referred to this iterative process. For example, Siggelkow (2007, p. 21) argues, ". . . it seems useful (and inevitable) that our observations be guided and influenced by some initial hunches and frames of reference. . . ."

Specifically, we began with a broad inquiry of trying to better understand how organizations make decisions to stop failing new venture projects. Our investigation was initially driven by the literature that suggests that organizations struggle with this issue (for instance, Boulding et al., 1997) and initial comments by informants who stated that their firms do not know how to properly stop projects and learn from them. As we delved more deeply into the issue of failure and learning, we developed more directed questions theoretically derived from the literature (Royer, 2000) with application to entrepreneurial cognition research (Mitchell et al., 2000).

In this section, we first explain the overarching research program from which the data were collected. We then provide descriptive statistics on the companies and their programs

Table 1

Case Descriptives

Case	Business description	Age of radical innovation initiative
1	Diversified industrial products	0 just beginning
2	Paper-making machinery products	0 just beginning
3	Diversified industrial products	7 months
4	Industrial gases and chemicals	1 year
5	Consumer, nondurable goods	1 year
6	Chemical- and science-based products	5 years
7	Computer systems and related goods	2.75 years
8	Chemical and plastics manufacturing	3 years
9	Materials	2 years
10	Specialty packaging manufacturing	7 years
11	Diversified industrial and consumer products	8 years

for corporate entrepreneurship. This is followed by information on our interview protocols and the procedures we used for analyzing the data used in this particular project.

Research Program

The data used in this paper were sourced from a broad research program that seeks to understand how corporations develop capabilities for radical innovation. Radical innovations have an entirely new set of performance features, process improvements of five times or greater, or a minimum 30% reduction in cost (Leifer et al., 2000, p. 5). With technology and innovation at its foundation, successful radical innovation results in the creation of entirely new markets and completely new businesses for the firm (Kelley, Neck, O'Connor, & Paulson, 2005) and tends to lead the organization toward organizational and strategic renewal (Covin & Miles, 1999). Thus, radical innovation can be viewed as a proxy for corporate entrepreneurship activities.

Along with seven other multidisciplinary researchers from three institutions, we tracked radical innovation programs—technological entrepreneurship initiatives—in 11 industry-leading firms. Three of the 11 firms are perennially in the top 10 of the Fortune 500 list, while the majority of the firms were in the Top 200 when we began the study in 2002. In order to qualify for the sample, a company had to have a radical innovation program in place or a declared strategic intent to develop radical innovation capabilities. Age of the radical innovation initiatives at the start of the study ranged from just starting to 8 years. The average initiative age was 2.76 years. Confidentiality agreements were signed with each of the participating companies and going forward each company will be referred to by a case number so that specific data cannot be linked to any of the participating companies. See Table 1 for company descriptions and age of radical innovation program.

Interview Protocol

Over a 3-year period from 2002 to 2005, 246 interviews were conducted, including screening interviews, initial on-site interviews, and follow-up interviews every 6 months.

Internal company documents, reports, and news accounts supported the primary data collection method. All interviews were semi-structured, at least 1 hour in length, and followed a specific, predetermined protocol. A protocol was established for each phase of the project including the initial interview (full day with multiple informants), 6-month follow-up interviews (4–5 per company with corporate entrepreneur), and final interview (1 per company with corporate entrepreneur).

The initial full-day on-site interviews focused on the history of the radical innovation initiative; radical innovation processes; the innovation portfolio; initiative links to other innovation activities; structure of the initiatives; capability development; metrics; leadership; and priorities and challenges over the next 6 months. Over time in the 6-month follow-up telephone interview, protocol varied depending on the nature and timing of the interview. The overarching focus of each 6-month interview addressed changes to and progress of the radical innovation program. In general, the follow-up interviews began with broad questions regarding milestones since the last interview and any internal or external changes that had an effect on the various new venture initiatives. The final interview protocol also focused on changes since the previous interview, but the corporate entrepreneur was also asked to reflect on the program's performance over the last 3 years and the progress the company has made in developing its radical innovation capability. At least three research team members were present for all interviews. All interviews were recorded and professionally transcribed.

Questions pertaining to the current study were not overt because we did not want to lead informants in a particular direction. Initially, broad questions were asked regarding metrics or other types of performance measures (e.g., increased staffing, increase reputation of team members, transitioning of projects). Most companies in our sample did not have predefined metrics, given the high uncertainty and lack of performance data associated with long-term breakthrough innovation projects. Acquiring this knowledge in the initial interviews encouraged us to ask probing questions throughout all interviews related to starting and stopping projects, developing metrics, evaluating opportunities, reaching milestones, and the overall process to "kill" projects that have been in the system too long.

In this paper, we are most interested in tracking the lead corporate entrepreneur, the person most responsible for managing the portfolio of radical innovation projects or leading the radical innovation program, over the time period studied. This focus allows us to examine the cognitions of the person with the most direct responsibility over the portfolio and to compile a longitudinal leadership perspective within a complicated innovation structure. On average, each of the 11 firms was exploring three to five broad technology platforms within the radical innovation program in which they were trying to master new scientific techniques or patent new technologies that may lead to new venture commercialization. Collectively, each radical innovation program yielded hundreds of venture opportunities, some of which received only minor funding and others that moved completely through commercialization, expending millions of dollars in financial and human capital. The lead entrepreneur for each firm was interviewed at least four times over the 3-year period and some were interviewed as many as eight times. As a result, we analyzed a total of 53 interviews for this study.

Data Coding

As mentioned above, qualitative research can be an iterative process demanding that researchers continuously build insights by exploring the data, going back to the theory, and then back to the data again (Strauss & Corbin, 1998). By its nature, qualitative research provides rich detail, but it can also be a messy process (Denzin & Lincoln, 1998).

Table 2

New Venture Ability Scripts Used in Coding

Venture diagnostics	Situational knowledge	Ability–opportunity fit
The ability to assess the condition and potential of ventures and to understand the systemic elements involved in their creation	The ability to draw on lessons learned in a variety of ventures and apply those lessons to a specific situation	The ability to see ways in which customer and venture value can be created in new combinations of people, materials, or products

Source: Adapted from Mitchell et al. (2000).

In order to bring discipline to our process, we used NVivo, a computer-aided text analysis software program, to facilitate coding and ensure additional rigor.

As members of the research team, we began our initial investigation with a broad objective to better understand the failure and the process of terminating internal new venture projects. Interview notes, conversations immediately following interviews, and initial readings of the transcripts indicated that this was an issue that corporate entrepreneurs struggled with. These preliminary conclusions then lead us to theory and empirical findings regarding project termination. Additional reading of this literature and deeper immersion in the data led us to Royer's (2003) work suggesting that the difficulty of killing failing ventures may have a strong cognitive component.

As such, our initial coding scheme was based on the entrepreneurial cognition research of Mitchell and colleagues (2000) and their definition of an ability script. As defined above, an ability script is part of the new venture creation decision-making process and consists of knowledge structures that individuals have about the capabilities, skills, knowledge, and attitude required to start a venture. Therefore, the first round of analysis involved coding interview data based on the ability scripts of venture diagnostics, situational knowledge, and ability–opportunity fit as detailed in Table 2.

After reviewing the initial coding, it became evident that data related to stopping projects and learning from failure were consistently coded as "situational knowledge." A second, more refined round of coding was necessary to code passages specific to learning since situational knowledge included innovation process data not pertinent to our study. Once all data pertaining to terminating projects and learning were parsed out, we were then able to identify patterns in the data that allowed us to draw conclusions regarding termination scripts and types of learning associated with such scripts. Data were analyzed through multi-case analysis methods (Eisenhardt, 1989; O'Connor, Rice, Peters, & Veryzer, 2003; Siggelkow, 2007; Yin, 1994) incorporating grounded theory methodology (Strauss & Corbin, 1998). This form of analysis is consistent with "extended" case methodology (Burawoy, 1991; Danneels, 2002), which is designed to allow researchers to integrate and synthesize existing bodies of research. This approach provides us the freedom to build on existing entrepreneurship cognition research (Mitchell et al., 2000).

Two of the three authors coded and analyzed all transcripts. To achieve a minimum 70% intercoder reliability suggested by Miles and Huberman (1994), we did the following: (1) each coding-author coded the same set of transcripts (for one company) for ability scripts as defined by the literature; (2) coding was merged to determine discrepancies in coding; (3) discrepancies were discussed and the definition of ability scripts was better

Table 3

Prevalence of Termination Scripts

	Termination Scripts		
Case	Undisciplined termination	Strategic termination	Innovation drift
1	X	X	
2	X	X	X
3		X	
4	X	X	X
5		X	X
6		X	X
7	X		X
8			X
9	X	X	X
10			X
11		X	X

refined by citing examples in the data; (4) authors then coded another set of transcripts for another company in the sample, where acceptable inter-coder reliability was achieved; and (5) the remaining transcripts were coded based on the original definitions of venture ability script plus the subscripts detailed by Mitchell et al. (2000) (Table 2).

Analysis

Our analysis of nearly 70 hours of interviews and supplementary documents suggests that corporate entrepreneurs often make use of a termination script, and we found evidence of learning resulting from script deployment. Additionally, our initial script-coding led to the emergence of three distinct cognitive scripts that corporate entrepreneurs used to make termination decisions regarding failing or fledgling innovation projects. In the following sections we discuss the types of termination scripts with evidence of learning. We then turn our attention to specific types of learning associated with each of the termination scripts.

Types of Termination Scripts

We found that corporate entrepreneurs use up to three specific types of termination scripts, which we label as undisciplined termination, strategic termination, and innovation drift (see Table 3). Our investigation focuses on the individual corporate entrepreneur and his or her cognitive scripts, but as Royer (2003) suggests there is a link to organizational-level issues, perhaps most notably the rules and procedures that are in place. In fact, a baseline differentiation between what we term strategic termination and the other two scripts appears to be connected to the processes and procedures the organization has in place. Whereas strategic termination occurred more often when processes and metrics where firmly in place, entrepreneurs used "undisciplined termination" or "innovation drift" when minimal rules appeared to be the norm. We discuss each of the scripts below

Table 4

Strategic Termination Scripts and Learning Implications

Termination script	Symptoms	Overall learning implication
Undisciplined termination	Kills projects without a developed understanding of market, technical, and organizational factors Organization uses a traditional stage gate system to monitor progress Organization uses a incremental innovation metrics Organization focuses on lack of success of technical requirements without a focus on market potential	Learning is stunted because opportunity was not allowed to develop. Ineffectiveness of incremental innovation metrics forces the organization to learn and apply more appropriate forms of project evaluation and review.
Strategic termination	Neither technology nor market issues can be successfully addressed Venture size—opportunity can be exploited but revenue potential falls below corporate needs Opportunity does not fit the resources, structure, or strategic plan of the organization	Concomitance of market, organization. and technology factors allows individual and organization realize the importance of all factors necessary for venture development and their interaction.
Innovation drift	Individuals in the company talk about learning from failure but use this as an excuse to rationalize keeping projects in the system too long Lack of willingness or skill to terminate a project. Organization focuses on success of technical requirements without a similar focus on market issues No landing zone; the project that develops is not aligned with the strategic direction of the organization	Time lag diminishes the organizational memory. and opportunity to learn from failure is restricted. Technical learning may be enhanced, but market learning and learning for commercialization suffers. Learning dissolves given lack of ownership of the radical innovation project. Project and learning are "shelved."

and provide a summary of the symptoms that led us to differentiate among the scripts as well as interpret learning implications. A summary is provided in Table 4.

Undisciplined Termination. The undisciplined termination script is indicative of a quick decision to "kill" a project without regard for possible learning opportunities. Five of the 11 corporate entrepreneurs exhibited this subscript. We found that early kill rates were high in some companies and the corporate entrepreneurs admitted that termination of an innovation initiative may result in potential missed opportunities. As one corporate entrepreneur noted, "You need to be careful that the system doesn't kill it prematurely" (Case 7), indicating a need to balance a disciplined and rigorous innovation process with flexibility in order to explore and experiment to acquire more market and/or technical information. With tighter budgets for breakthrough innovation, senior management is looking for more immediate results from newly initiated projects, yet such a need for speed can also lead to missed opportunities, as illustrated in the quote below:

> And so if you're going to an approach where you're going to fund them to lower levels and require a shorter time frame to do it, one of the things you have to be willing to accept is you're going to kill good ideas. Well, you're going to. It's inevitable (Case 4).

Interestingly, the five corporate entrepreneurs identified as using undisciplined termination scripts led very rigorous innovation initiatives. Processes were methodical and tightly managed. Fledgling projects that had low probabilities for success were quickly

terminated. Although the potential for missing a big opportunity was present, there was little cause for alarm given the systematic nature of their processes. We call this script undisciplined because there was little patience within the organization to experiment for any significant period of time. We found little evidence of learning; the priority was moving on to the next project. When the undisciplined termination script is employed, potential for learning is low because not enough time has passed to feel failure or capture learning. Little knowledge is gained, but few resources have been wasted. As a result, there is no need to fully justify learning at the expense of the organization.

Strategic Termination. What we term the strategic termination script emerged from the data on numerous occasions within our sample. Strategic termination is indicative of a concerted effort to acquire sufficient information to know when to terminate or to continue a project. Eight of the 11 corporate entrepreneurs used this script. We found that the strategic termination script led to maximized learning because the corporate entrepreneur was willing to reflect on what went wrong and to capture the learning in order to move forward to future projects. Central to the strategic termination script are processes used to measure project performance and the achievement of milestones in order to make calculated decisions about moving forward or termination. The rational nature of process is necessary to overcome overzealous project leaders who are passionate and committed to the project as described by Royer (2003).

Process and metrics bring objectivity to innovation. Within the domain of strategic termination, we found evidence that projects were terminated for various, yet all objective, reasons such as the venture not reaching revenue targets; lack of technical progress; inability to reach markets or lack of market knowledge; and lack of strategic fit with organization goals. Establishing milestones with consequences for underperformance sent messages throughout the innovation organization that time is of the essence and resources will not be wasted.

> You have to look down the road 18 months or a year or whatever your vision is and say that I must accomplish this. If I want to do what I say I'm going to do in this initiative with the money I'm being given, I must have accomplished this, this, and this. And those are your milestones. And if I miss those milestones, tell me up front what I am going to do about that. If I don't hit the sales figure that I thought I'd hit halfway through what am I going to do? Am I just going to ride with it like we used to do, or am I going to start destaffing the effort. For example, in one of the projects we have, the leader of the project comes forth with the milestone by the third quarter or second quarter of this year. He was going to have three partnerships signed for distribution of the products. And if he doesn't have those signed, his game plan is to be destaffed by 70 percent. Clearly spelled out. My equation says process helps the discipline which can make you more effective at being innovative (Case 4).

The vision-based, holistic orientation evidenced in the above quote is characteristic of strategic termination scripts. The necessity for due diligence and goal setting prior to embarking on high uncertainty projects is a hallmark symptom that strategic termination cognitive processes are in place. Further evidence is cited below.

> This is total business development. So you're really making the case. We're not trying to make a new light bulb here; we're trying to make a new light bulb, but also have a way of selling the bulb and manufacturing it before we make the new light bulb. So it's kind of an analysis of what you're going to get out of this before you start and not leave it to accident (Case 1).

Learning appears to be maximized when strategic termination scripts are in use because the objectivity and controls within the process highlight success and any deviations from success. Additionally, because termination, failure, and killing projects are expected outcomes within radical innovation initiatives (Leifer et al., 2000), a process should be in place to capture learning. As such, there is optimism that "spinout" learning is important enough to warrant the capital investment for a significant amount of time. Breakthrough innovation, central to the companies under study, is a long-term path so tolerance for time and investment tends to be relatively commonplace and learning a top priority.

Innovation Drift. Symptomatic of an innovation drift script is the tendency to let projects continue when the chances for commercial success are at best limited. The inability to kill projects in a timely fashion results in wasted resources that could be reallocated to other high-potential projects. And because firms let these projects drift, no one is keen to secure learning. New opportunities gain their own momentum at the organizational level and it becomes difficult for a single individual to take appropriate action.

> They have far too many resources for what is really a concept stage project, and so once you build up momentum of a million dollar project, it is very hard to kill it (Case 4).

The presence of an innovation drift script is supported by the literature, which explains that learning from failure is not automatic (Shepherd, 2003; Ulmer, Sellnow, & Seeger, 2006). More pointedly, the "problem" with success is that it deludes individuals and organizations into thinking everything is fine, believing no corrective response is necessary (Sitkin, 1996). Unfortunately, this is a mirage for corporate entrepreneurs who want to focus on securing the future of their firms through strategic or organizational renewal, because ". . . if the goal is to promote stability and short-term performance, success provides an excellent foundation for reliable performance. Success tends to encourage the status quo" (p. 543).

Nine of the 11 corporate entrepreneurs recognized and spoke about innovation drift. Although reasons for not terminating vary, the undertone is that no one is standing up to say, "It's time to stop."

> Many people will say one of the main reasons we're not very good at new things is because we will not kill anything. We just kind of keep things going and going and going versus saying, Okay—tried that sufficiently, stop that, and reallocate resources (Case 7).

Issues of concern limiting the termination capacity of the company also stem from a lack of career paths for project members. In other words, once a project is terminated there may be no place for team members to go or there is a lack of clarity around redeployment.

> I think there's still a lot of people that worry a lot about where their career is going. Actually, one of the services and solutions activities was just killed last week, and so there was a lot of discussion this morning at my staff meeting about what does it mean, what's happened to the people. And what has happened to the people is they basically went into lateral jobs. Nobody has gotten fired. Nothing, you know, super negative has occurred (Case 4).

In addition, the lack of process in some of the companies prevented the objective measurement of progress that we found with the strategic termination script. As one corporate entrepreneur noted, "And just like anything, you can make something look

pretty and kid yourself" (Case 7). We found that it was widely acknowledged that some projects were not progressing and the chances for commercialization were slim, but corporate entrepreneurs were not stepping up to the plate to kill the project and reallocate resources even though this was known to be the optimal decision. Killing a project takes courage.

> And one of the things that I've observed in this business, and I don't know if we can generalize it, it's always risky to do so, but sometimes I think the things that dwell in the pipeline are destined to die, and we just haven't figured it out yet. The stuff that's destined to succeed moves through relatively quickly. Now, you've got to be a little careful there because some of the stuff that kind of lingers in the pipeline, if it's doing so for good reason, like a key piece of technology is missing, or, you know, I don't know, we're waiting for something to occur out in the market that hasn't occurred yet, that might be a reasonable reason why something would linger. But sometimes I think they linger because we just haven't quite mustarded up the courage to kill it (Case 11).

Learning is limited because projects linger and tie up valuable resources that could be better utilized in the innovation portfolio. Until someone in the company can admit failure and muster the courage to kill the project there is little room for capturing learning. The only learning taking place is a willingness to learn how to kill projects. Accountability is lacking.

In sum, our initial coding allowed us to capture the presence of termination scripts used by the corporate entrepreneurs in our sample. We expected to find that companies primarily used one of these scripts, yet our analysis revealed that eight of the 11 companies in our sample used more than one type (Table 3).It also became evident that the learning that took place across the scripts varied significantly. This led the research team to identify patterns across the scripts, thus leading to a deeper understanding of learning from failure. Cross-case comparisons and deeper delving into the learning passages coded per termination script led to the emergence of two broad types of learning-action learning and post-performance learning.

Learning Associated with Termination Scripts

Action Learning. Action learning results from using the innovation project as the primary vehicle for learning (Pedler, 1991); therefore, it is a learn-by-doing experiential approach. Given the uncertainty associated with breakthrough innovation, the amount of information that is unknown at the start of the project is far greater than the amount of known information. Language such as "learning by doing" (Case 7) and "jump right in" (Case 5) were commonplace in our interview data.

Several themes emerged from the data with respect to action learning. Table 5 summarizes the linkages between the termination scripts and the different forms of action learning with respect to resource management, cross-organization learning, and spinout learning. Most notably, one can see the positive learning opportunities related to strategic termination and how the other two scripts appear to hamper learning.

First, corporate entrepreneurs talked openly about learning how to navigate the organization to marshal resources and support for breakthrough initiatives. The corporate entrepreneur quoted below has learned that financing radical projects may need a different innovation system than those used with more traditional incremental projects within the organization. The absence of capital was limiting the progress of potential successful breakthroughs.

Table 5

Termination Scripts and Action Learning

	Resource management	Cross organizational	Spinout
Undisciplined termination	When ventures are terminated too quickly without allowing capabilities and competencies to develop from the resources deployed high levels of learning are unlikely	Ventures are prematurely terminated without proper attempts to network both inside and outside the firm that could allow for further development of the venture	When the venture is shut down early, the opportunity for learning to assist in other incremental innovations is lost
Strategic termination	Ventures are terminated after careful consideration based upon failed attempts to develop competencies. Learning about the process of marshaling resources in the firm is captured	Ventures are terminated and learning is developed in the form of networks for future opportunities.	As the venture is terminated, "spinout" learning is provided to other venturing initiatives.
Innovation drift	Resources continue to be deployed despite evidence that suggests that the new venture will fail.	The venture team continues to seek out new partnerships despite research that suggest the venture will fail.	As the team continues to focus on a failing venture, their ability to provide lessons to help other ventures is constrained

> I do not think that we have enough experience with the system. I really don't. [Funding] can be a major problem. The thing that we are addressing now within this stage gate process is how to handle big stage funding where you are talking about some major dollars and capital. Because the way that we are organized right now, capital decisions above a fairly low level require board approval. So there is no one on a gate review committee that has the authority to make that capital decision (Case 2).

An additional action-learning theme is cross-organizational learning—leveraging learning from other parts of the organization and applying this knowledge to existing corporate entrepreneurship initiatives. Other parts of the organization were considered sources for pipeline ideas, as indicated below.

> I've been working a lot with the other marketing managers and directors to help understand where they see their growth platforms. And I've just recently started down the path of trying to work with our sales organization to understand how they view business growth and the networks and contacts that they have. I'm learning a lot of—personal education in terms of what the marketing and sales functions have been doing and what they would like to do (Case 10).

Learning how to resolve technical issues from another R&D group or learning about new markets from different business units was common among companies that had a reputation for collaboration and cross-organization learning.

> Interdependency today is an expectation, and I think it's a very, very positive thing. We are not sharing projects at this point with a group, but we are sharing a lot of learnings around technologies. We are picking up technologies from other groups fairly regularly and getting their counsel. I had a really tough technical question a couple of weeks ago that, you know, most companies just couldn't get the answer, and

we found a very key guy here. He assessed the issue, and in two hours gave us the answer, and gave us the confidence to move forward which we just wouldn't have had. So we are starting to see a fair bit of that (Case 5).

The final action-learning theme stemmed from simply learning as the project progressed about the potential for success or accepting spinout learning. Spinout learning occurred when long-term breakthrough projects failed, but smaller and successful innovations were discovered in the process. As one corporate entrepreneur stated, "There's virtually nothing to lose in going for breakthrough because the spinouts will pay for themselves anyway. They're just a spinout learning" (Company 5). However, we found that such dependence on spinout learning led to a greater likelihood for corporate entrepreneurs to employ their innovation drift script.

Yet the strategic termination script was tightly aligned with conscious learning as a project progressed through the pipeline toward commercialization. Quoted below is a corporate entrepreneur discussing how concurrent learning between market and technical feasibility can lead to a termination decision.

I think lack of technology progress is rarely strictly the cause, and we seem to be able to make progress technically on a lot of things. But the way I would kind of describe it now is as you make some progress on the technology and learn more about the market opportunity and also see how the specific progress you've made starts to map onto the opportunity you start to see some discontinuity. Our process puts a lot of attention on market relevance and commercialization throughout the life of a project. So, as we do some of the technical work we see [market] discontinuities and that can become a reason for stopping a project. Based on the progress we've made, and perhaps not made, opposite the opportunity and any changes we now see and how we understand that opportunity we may see a gap developing and we need to redirect or stop a project (Case 9).

Post-performance Learning. Not surprisingly, all companies were able to discuss learning after a project was terminated or failed. Three learning themes related to post-performance learning emerged from the data: learning in execution, learning about skill and/or competency gaps, and learning about innovation fit within the strategic direction of the organization.

Learning from execution involved lessons around timing of market entry, technical feasibility, and understanding customer needs. Many of the companies were too far removed from the market and its end-customer and learned that being close to all levels of customers throughout the entire innovation process was important. The following quote illustrates a corporate entrepreneur reflecting on a failed project.

We're going to do a lessons learned. What went wrong here? We did the best we could, but it obviously wasn't good enough. What went wrong here? And so one of the things that we learned was that we were not close enough to the end customer. The end customer. Not our direct customer. End customer. And the end customers in this case were the telephone companies. We were not making money, they were not paying capital, and so forth. But they were not telling that to their suppliers who we sold to. So, reaching out and being close to the end customer all the way from a research perspective on to the commercial perspective is one [lesson] (Case 6).

Lack of execution ability led to an understanding of skill and competency gaps. This same company, Company 6, learned over the course of several projects that their primary

weakness was early-stage marketing. Given their breadth and depth of technology expertise, they began recognizing that the source of most failure was on the business side of execution.

> [Company] is not a particularly strong marketing company, we're so technology oriented. The market is always sort of second class status. We've known for years, we've done umpteen autopsies on our projects, but the number one thing that determines success or failure of innovation activity at [Company] is not technology. We're very strong there; it's always the early stage marketing part. That's what we're trying to shore up (Case 6).

A common problem leading to innovation drift stemmed from lack of project alignment with the overall strategic direction of the company. Even though initiatives were charged with creating breakthrough innovation, many lacked direction and, therefore, found themselves innovating in non-strategic spaces. As projects progressed through the pipeline, higher level organizational support started to diminish. Innovation teams started realizing that "fun" technology was not necessarily important technology to the organization. The lead entrepreneur in Company 5 began putting system tools in place to help innovators better align their projects with the strategic direction of the organization.

> If there's one place that I would like to have a better magic bullet, it would be in teaching the groups to gain alignment faster. And we're using process excellence tools and design excellence and that's where we're teaching people to try to learn that. But it's hard to flow that through the organization really fast. I'd love to be able to do that faster because the hardest part in this is to get and sustain alignment. The ideas around here are plentiful and people can access things and they access technology and all kinds of stuff. But maintaining that alignment is so incredibly critical because otherwise you can lose an inordinate amount of time (Case 5).

We found the tools for opportunity-analysis planning critical to the objective, rational nature of termination decisions. Entrepreneurs tend to be very passionate about projects (Royer, 2003). Lead corporate entrepreneurs managing innovation portfolios need to establish rigorous systems and processes to ensure innovation drift does not occur. One company in our sample used critical assumption planning to guide corporate entrepreneurs in making strategic termination decisions in consort with the project review board. The lead corporate entrepreneur noted:

> Let me take this issue about the critical assumption planning and make it very real. What the team learned as they went forward was that this was not an opportunity we should pursue. And the natural tendency of the teams was to say, well, the tool was wrong as opposed to the answers they got, they're wrong, and the natural questions that came up after the Venture Board in which they shared their learnings and everything, the team had not gotten to the point where they recommend discontinuance of the project or redirection of the project. They wanted to do another round of learning. It was very clear that the next round of learning was just going to make the obvious more obvious. And so the Venture Board said that we've got other better opportunities we ought to be looking at and so they asked the team to wrap the project. And the natural tendency of the broader team was, well, I don't ever want to use that tool. But a small portion of the team said, no, this is exactly what the tool is for to help us understand what projects we ought to be going forward with and understand and help us learn about the opportunities, and do it better and faster so that we move on when we should and that we invest the right amount when we should (Case 11).

Overall, we found that many of the lessons gleaned through post-performance analysis could have been learned during the project if processes for capturing action learning were in place. Furthermore, corporate entrepreneurs leading radical innovation initiatives are operating in a different world, so to speak. The rules of the game are unclear and ever changing. Success and failure are measured differently because innovation groups are attempting to solve problems that were once thought unsolvable. A corporate entrepreneur leaving his post for a new assignment in another part of the organization reflects on his learning.

> I certainly have learned. I managed groups in the past, but I was very much aligned with a business unit at that time, and so it was more about managing resources, and the projects were agreed to by the business. Now, we're generating the projects, or we're working with people who are generating the projects, so I had to learn to work in a world that's much more ambiguous, one that doesn't have clear support across the leadership of the organization—the organizational leadership as we had in the past. So I've had to learn to deal with the political issues too, had to deal with people who did like [radical innovation group], who didn't like [radical innovation group], who deal with budget pressures that were not as difficult in the past. It's been a lot more about motivating people in a different way, trying to draw on their intrinsic motivation for innovating, for entrepreneurship (Case 8).

As a group, the companies in our sample are competing to commercialize the next big innovation, which requires timely reflection, immediate course adjustments, rigorous and ongoing analysis, and contingency planning. Action learning is real-time learning, and the organization must develop systems to capture that learning along the way. High-uncertainty, breakthrough projects typically have long time horizons—10–15 years (Leifer et al., 2000). Given the lengthy development period, action learning should be given greater priority. If too much time passes or the organization waits to capture learning after the project is terminated, institutional memory diminishes and valuable learning may be lost (Sitkin, 1996). It became evident after understanding post-performance learning of the companies studied that the more one depends on post-performance learning, the greater the likelihood for innovation drift.

Implications

The emergence of the three termination scripts of internal new ventures builds on existing research by Mitchell et al. (2000). Their work demonstrates the importance of cognitive scripts to the new venture creation decision process but did not address failure and learning. However, as the project termination literature suggests, knowing how to properly "kill" ventures and capture learning from them is an ability that needs to be developed within the corporate entrepreneurship domain (Boulding et al., 1997; Schmidt & Calantone, 2002).

By examining the entrepreneurial cognition literature together with the work on termination, our study posits that corporate entrepreneurs do develop scripts for terminating projects and these scripts have implications for learning. Our data show that corporate entrepreneurs use scripts to make strategic, and perhaps not so strategic, decisions once it is determined that a venture is no longer tenable. Unfortunately, the literature suggests that too many organizations let prospective ventures drift, wasting precious resources before finally killing them off (Biyalogorsky, Boulding, & Staelin, 2006; Henricks, 2004). The primacy of our study is that some scripts appear to lead to more and

better opportunities for learning. It appears that the strategic termination script allows individuals and the organization to learn (Crossan, Lane, & White, 1999) from their failure. We suggest that organizations need to engage failing projects and develop an ability to terminate them systematically in order to capture learning for future use.

In our sample, the amount of post-performance learning far outweighed the amount of action learning taking place, and we suspect that action learning could be enhanced if strategic termination was the dominant script in use. Strategic termination is where learning is maximized. When entrepreneurs used this script, there was a concerted effort to capture learning and use this knowledge in subsequent breakthrough innovation projects. Ideally, corporate entrepreneurs with an undisciplined termination script could be better served by developing a script for strategic termination. Similarly, those with a proclivity to overuse the innovation drift script may also need to develop their strategic termination script.

Of course, while we argue for the development of a strategic termination script, our research does not seek to promote failure. Instead it is a response to a need in the literature regarding the inevitability of failure of new product initiatives and the opportunity for learning that comes from it. Our study should be seen as a means to an end: to develop a viable pathway to amplify the learning that is being missed due to a natural aversion to failure (Mirvis & Berg, 1977). As can be seen by the work of others (Shepherd, 2003; Whittaker, 2001), this concern is central to research examining human capital and technological entrepreneurship. From a human capital perspective, it appears to be that cognitive limits block learning that could come from failure (Shepherd, 2003). Within the technological entrepreneurship domain, this tends to be exacerbated in firms seeking new ventures that are dominated by technologists and engineering personnel because engineers are predisposed to avoid failure and not learn from it (Whittaker, 2001). Whitaker explains, "Engineering training is, to a large measure, directed toward the prevention of failure . . . Engineered systems are designed not to fail, so engineers are preoccupied with failure" (p. 81). Below, we explain our findings and discus specific implications for both scholars and practice.

Implications for Scholars

Previous research has suggested that entrepreneurs do not take the opportunity afforded to them to learn from failure (McGrath, 1999; Shepherd, 2003). McGrath tells us that this happens even when failure might "be the right thing to do" and Shepherd explains that our cognitions often preclude us from capturing the positive benefits in a failing venture. Findings from our study suggest that if corporate entrepreneurs use their fledgling initiatives as opportunities for learning (action learning as described above [Pedler, 1991]) by incorporating a strategic termination script, learning may be enhanced. Our results above also seem to suggest a link between strategic termination and action learning. More specifically, our study provides three distinct contributions to the scholarly literature.

First, our work provides support for Shepherd's (2003) contention regarding cognitive learning impediments in failing ventures. With the exception of one case, each of our corporate entrepreneurs showed evidence of cognitions that resulted in letting projects linger or killing them without "proper" justification. Examples of both cognitions occur over and over in the data and seemed to suggest a learned pattern of behavior regarding the termination of ventures. Beyond Shepherd's broad speculation regarding the role of cognitions, our data suggest that entrepreneurs developed specific termination scripts, some of which seem to impede learning from failure (undisciplined termination innovation drift). As our data above suggest, some corporate entrepreneurs would terminate

ventures in an undisciplined manner without getting a true sense of how their resources and capabilities could be deployed; without networking the venture appropriately; or by applying inappropriate systems or metrics, etc. (see Tables 3 and 4). In the same manner, almost all of the corporate entrepreneurs let ventures drift somewhat aimlessly beyond the point when it became clear that failure was most likely. Again, Tables 3 and 4 provide details that support our earlier exploration of the data.

Second, our work also provides support for the theory that argues that learning from failure can improve a firm's capabilities in other endeavors (McGrath, 1999; Sitkin, 1996), such as future new ventures. When we saw corporate entrepreneurs use a strategic termination script to apply proper tools to gauge venture development and manage irrational expectations for success appropriately, while concurrently addressing market, technical, and resource requirements, they tended to "succeed at failure" and capture learning (again, see Tables 3 and 4). The potential for learning capture is what makes the strategic termination script distinct from undisciplined termination and innovation drift. Sitkin (1996) notes that learning from failure is best when information is analyzed and adjusted to quickly and that that failure allows one "to obtain information that would not be available with the experience" (p. 555). With undisciplined termination, entrepreneurs do not allocate enough time to gather the "right" information or to benefit from the experience. With respect to the innovation drift script, we see the temporal concern that Sitkin theorizes about. As the time lag grows between when the initial strong signs of failure emerge and when the firm eventually terminates the initiative, learning can be lost.

Third, and perhaps most important, we believe that this study demonstrates the possibility for enhancing learning from failure for corporate new ventures. By drilling down into the entrepreneurial cognitions of corporate entrepreneurs, we have been able to identify three specific scripts that individuals use in making decisions regarding the termination of ventures. Developing these expert scripts is important because those who are expert at a particular task are able to outperform others, as over time they develop domain-specific knowledge structures or mental schemas (Lord & Maher, 1990) which confer an ability for superior performance due to continued mapping of ordered mental steps pertinent to a particular action, activity, or field of interest (Read, 1987).

Our study provides the first step down a pathway toward understanding the importance of the development of an expert script for the termination of corporate new ventures. Just as the work of Mitchell and his colleagues identified the common cognitive scripts for deciding how to start a new venture, our study can provide a foundation for the development of cognitive scripts for the termination of corporate venturing projects, thereby filling a void in the literature (Balachandra, 1984; Boulding et al., 1997; Royer, 2003). By identifying the positive learning aspects of the strategic termination script and also explicating the deleterious aspects of scripts that seem to negate learning, this study establishes a foundation for future work to explore the development of an expert termination script.

Implications for Practitioners

First, we believe that it is important for all entrepreneurs to understand the importance of scripts and the fact that we all use them. And while psychologists do not completely understand how individuals develop and use scripts and schemas (Walsh, 1995), practicing entrepreneurs need to have at least some appreciation of how their use of various cognitive scripts affects their decision making.

What is clear is that individuals who have experience in a certain domain tend to develop a script for working in that domain (Lurigio & Carroll, 1985). Additionally,

individuals who have a great deal of experience in a particular domain have scripts that can be accessed more readily than those who do not (Smither & Reilly, 1989). For our purposes, this is extremely important because it suggests the need to tie failure and learning more closely together. Corporate entrepreneurs cannot afford failure just for failure's sake; they must learn from failure. Our research suggests that corporate entrepreneurs must embrace their failing projects more closely in order to gain an expertise and develop a script that can transform failure into learning. As the psychology literature suggests, the more work you do in a certain domain, the better you will become at handling it.

This means that corporate entrepreneurs must not stop failing projects too soon before getting close enough to assimilate and understand why the project needs to be terminated. Similarly, they cannot afford to let projects continue aimlessly, wasting time and other significant resources. By engaging these failing initiatives directly, entrepreneurs may be able to develop a script that allows them to both terminate and learn simultaneously. Table 3 illustrates the learning implication based on the termination script used. The second column in Table 3 lists various symptoms indicative of each script. The final column addresses both negative and positive implications of the potential learning through termination of radical innovation projects. Practitioners are likely to see why chances for capturing learning are unlikely if the undisciplined termination script or innovation drift script are in play. We implore practitioners to try to get closer to these projects in an attempt to develop a strategic termination script.

By not focusing singularly on technology factors or market factors in isolation, practitioners can learn where their ventures went off course and better understand all of the forms of uncertainty that must be overcome. Similarly, while some initiatives do develop into viable businesses, they are often not large enough to warrant sustainable corporate ventures. Simply put, as our informants told us, multi-billion dollar organizations cannot afford to continue to pursue opportunities that may return only $10 or $20 million. Similarly, individuals must recognize when their burgeoning venture—no matter how exciting or potentially profitable—just does not fit within the strategic direction of the larger organization. Forcing such initiatives into the organization can result in suboptimal performance for both the initiative and the existing operating unit that ultimately supports it. In sum, we suggest that practitioners use Table 3 as a guide to build toward a strategic termination script that will allow for individual and organizational learning.

Limitations

While we believe the identification of the three termination scripts help fill some of the gap within the entrepreneurial learning and failure literature, researchers must understand that our work is not without limitations with respect to current and future research that examines the human capital and cognitions of entrepreneurs. First, one must realize the four important issues related to scope within this project: (1) the size of the firms involved; (2) the fact that we were investigating corporate entrepreneurs leading radical innovation programs; (3) the high technology environment; and (4) that the context excluded independent start-up entrepreneurs. Our research was motivated by a belief that there is a need for a better understanding of failure and learning within internal new ventures. As such, our sample examined billion-dollar organizations, some of the largest in the world, in order to guarantee visibility into numerous concurrent entrepreneurial endeavors. Due to this size, the sample we investigated was primarily involved with developing technology-based, radical new ventures that would generate hundreds of millions of dollars. These firms were so large that they often would forgo opportunities

that suggested markets of "only" tens of millions of dollars. As such, attempts to generalize our findings to research investigating human capital and cognition outside a technology environment or to traditional start-up entrepreneurs would require additional research. At the same time, the specific scope of our research does provide other researchers with the opportunity to investigate failure and cognition with corporate entrepreneurs who are focused on more incremental or nontechnical innovations.

Conclusions

The latest research on entrepreneurial cognitions suggests that future work needs to focus on the specific context in which entrepreneurial action occurs (Mitchell et al., 2007). Context is important because it could be considered antithetical for us to suggest the development of a failure script for *independent* entrepreneurs who do not have the benefit of a portfolio of options like their corporate brethren. However, we do argue for a termination script for *corporate* entrepreneurs engaged in developing radical or breakthrough innovation based upon advanced technology where the financial stakes are extremely high and learning can be applied to other numerous and parallel ventures in the portfolio.

Smilor (1997) argues that learning is essential to the entrepreneurial process and states that entrepreneurs learn from everything and everybody around them. In fact, he contends that "they learn from what works, and more importantly, what doesn't" (p. 344). However, while this may be true, the extant literature suggests otherwise. Harrison and Leitch (2005) discuss the different types of learning in entrepreneurial organizations and their review shows that learning from failure is absent in the literature, which is in line with what others have suggested (McGrath, 1999; Shepherd, 2003). Given this, it is not surprising that Harrison and Leitch (2005) conclude that research on entrepreneurial learning is still in its infancy.

The current study attempted to partially fill this void by bringing the cognition literature to bear on the practice of radical innovation within established organizations. Through an examination of 11 longitudinal case studies of breakthrough innovation we show that corporate entrepreneurs do, in fact, develop scripts for terminating projects. We also illustrate, however, that not all scripts lead to optimal learning and suggest alternatives to remedy this situation.

There is no denying that failure is a part of the entrepreneurial process. Our study embraces this fact and suggests—perhaps paradoxically—that both scholars and practitioners do the same in order to find success in the future.

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