Research Policy 32 (2003) 255–276
www.elsevier.com/locate/econbase

Improvising firms: bricolage, account giving and improvisational competencies in the founding process☆

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Abstract

Improvisation occurs when the design and execution of novel activities converge. Drawing on three samples of young firms, this inductive study investigates the existence, channels and implications of strategic improvisation in knowledge-intensive new businesses. Our study suggests that not only may founding itself be improvisational in some cases, but improvisational processes and issues permeate entrepreneurial activity and have non-obvious implications for emergent firm strategies and competencies. We develop propositions in four domains: (1) the occurrence of strategic improvisation; (2) tactical improvisation rising to the level of strategy; (3) network bricolage; and (4) improvisational competencies. This study contributes to research on organizational improvisation, bricolage and entrepreneurship. Theoretically and in practice, both improvisation and bricolage represent potentially rich additions to the vocabulary of entrepreneurial action.

Keywords: Improvisation; Entrepreneurship; Bricolage; Network; Strategy

1. Introduction

Scholars have long used the concept of improvisation to describe extemporaneous action in the theater, musical performances (Berliner, 1994), therapy (Embrey et al., 1996) and education (Borko and Livingston, 1989; Irby, 1992). Organizational researchers have described improvisation and extemporaneous activity performed by firefighters (Weick, 1993a), during product development projects (Eisenhardt and Tabrizi, 1995; Miner et al., 2001a), in schools (March and Olsen, 1976) during a strike (Preston, 1991), and after a ship navigation system failed (Hutchins, 1991). A growing body of theoretical work specifically addresses improvisation as an important organizational process (Crossan, 1998; Moorman and Miner, 1998a,b; Hatch, 1997, Weick, 1993b). Drawing on prior work in the arts and organizations alike, Miner et al. (2001a) define improvisation as occurring when the design and execution of novel action converge. Within this developing body of work, some theorists have proposed that organizations may not only improvise tactical adjustments in response to unexpected problems, but may also improvise strategically (Moorman and Miner, 1998b; Eisenhardt and Tabrizi, 1995). Strategic actions are those that affect or determine the fate of the firm as a whole (Quinn, 1980). Although a rich descriptive literature supports the possibility that strategic improvisation may occur,

☆ An earlier version of this paper was presented at the Technology Entrepreneurship Research Policy Conference, The Dingman Center for Entrepreneurship, Robert H. Smith School of Business, University of Maryland, May 2000.

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PII: S0048-7333(02)00099-9

given this definition (Pascale, 1984; Mintzberg and McHugh, 1985; Mintzberg, 1994), improvisation that influences strategy is difficult to examine.

This inductive study explores the potential existence, channels and implications of strategic improvisation during the founding process of new knowledge-based firms. We explore the strategic influence of improvisation in two contexts: (1) the improvisation of the firm itself, which we explore through the description of improvisational firm start-up processes; and (2) circumstances in which tactical improvisation rises to the level of strategy. These explorations also lead us to examine bricolage, a construct frequently used to describe the resource set invoked by improvisation, and also to explore the presence of improvisational competencies in our sample.

Although management theorists and public policy researchers agree that technology entrepreneurship has major social and economic consequences, the actual processes through which it unfolds remain somewhat opaque (Louis et al., 1989; Zucker et al., 1998; Shane and Khurana, 1999; Miner et al., 2001b). Cutting across competing definitions and claims about the appropriate domains for entrepreneurship research, the dominant image of the founding process in the entrepreneurship literature generally reflects a design-then-execution framework (Shane and Venkataraman, 2000; Stevenson and Jarillo, 1990; Gartner, 1988; Schumpeter, 1934). This assumes a mainly linear process in which entrepreneurial volition leads to gestational and planning activities. These activities are followed either by start-up or, eventually, the decision to abandon (Reynolds, 1994; Reynolds and White, 1997). Start-up intentions and gestation typically lead to the creation of a plan—even if only in the minds of the founders (Thurston, 1983)—against which the founders attempt to execute. We refer to this model as "design-precedes-execution" (DPE). In contrast—and as a complement to—the DPE model, we offer an improvisation lens for viewing the founding process and the early period of firms' existence.

In the improvisation framework, design and execution of the start-up converge. Founders may plunge into the start-up process, designing the firm as they create it. In some cases, design emerges as founders observe and provide accounts for activities they have actually undertaken. Unlike the DPE model, the improvisation ("Improv") framework does not require the entrepreneur to be a calculating actor driving forward through a challenging linear process. The improvisation model is agnostic with regard to the source of volition or impetus toward creating a new firm. It does not assume that the founding process or later activities represent well-structured "anticipatory, rational action" in which clear goals precede and are independent of action (March, 1998, p. 156; Merleau-Ponty, 1964).

We apply the improvisational lens to the start-up processes of a core sample and two supplementary samples of knowledge-based firms. Our research setting is particularly promising for improvisation research because the use of multiple methods, including direct contact and observation, provided rich data on the actual founding processes. This made it possible to inspect the potential existence and nature of specific improvisational elements and outcomes. In the sections below, we report our findings and develop propositions in four broad domains: (1) the occurrence of strategic improvisation; (2) tactical improvisation rising to the level of strategy; (3) network bricolage; and (4) improvisational competencies. The design of our study allows us to develop propositions inductively from our data; this study does not allow us to provide independent tests of the propositions.

2. Investigatory methods

The founding process presents an exceptionally promising context in which to study the potential occurrence of strategic improvisation and the sub-processes or implications of such improvisation. The founding process, carefully studied, can yield rich data because the organization itself consists of a relatively compact system of activity. Knowledge-based start-ups represent a particularly important setting because researchers have argued that improvisation may represent a sensible approach to strategy in the conditions of high uncertainty (Mintzberg and McHugh, 1985; Weick, 1987; Moorman and Miner, 1998a) that often characterize the environment for technology entrepreneurship. Our broad methodology follows standard norms and procedures for theory-building inductive research (Denzin and Lincoln, 1998; Strauss and Corbin, 1998; Ragin, 1987; Glaser, 1978, 1992).

We approached our inductive study with four basic questions. First, we asked did improvisation, as defined in the emerging literature on this topic, occur in the knowledge-based start-ups we observed? Second, if improvisation occurred, how did the process unfold, and did it involve strategic actions? Third, what resources did improvisation draw upon and fourth how did improvisation affect the competencies and routines that firms developed?

2.1. Sample

Our primary sample consisted of 25 firms in the computer training and air pollution consulting industries. Data were gathered in 1994–1995 on all but one of the firms with primary activities in these two industries in the Research Triangle area of North Carolina as part of a study of job creation and change in knowledge-intensive start-up firms (Baker, 1995; Baker and Aldrich, 1994; Aldrich, 1999). One firm declined to participate. At the start of data collection, the 10 environmental consulting firms were from 138 days to 14.5 years old and employed between 0 and 39 people. Median age was 3.7 years and median employment was eight full-timers. The 15 training firms ranged from 28 days to 19 years old and from 1 to 69 employees. Median age was 3.2 years and median employment was three full-timers. Over half of the computer training employees, and virtually all of the environmental consulting employees had technical or science degrees; many had graduate or terminal degrees. Most of the firms occasionally employed contractors for both clerical and technical roles.

So that we could extend findings and consider contrasts with this primary sample, we also observed two other groups of firms. One was comprised of 21 business-to-business software firms used as a pilot group for an ongoing study of human resource practices in start-up firms. A second supplement consisted of 22 faculty start-ups encountered during a 6-year period across five universities. Table 1 describes the data from the three groups of firms we used in this study, along with the original analytic approaches and the inductive procedures used for this study.

2.2. Data and analysis

Data from the primary sample were gathered through open-ended, semi-structured interviews, and through supplementary telephone conversations and review of company and public documents (Kahn and Cannell, 1957; Seidman, 1991). Primary initial interviews were typically 2–3 h long, although several lasted much longer. In about two-thirds of the firms, participant observation was conducted for accumulated periods from 1 day to 2 weeks in duration. Founding managers of each firm (some of whom were no longer with the firms, but were interviewed elsewhere), and other senior managers were asked about: (a) their personal and work biographies; (b) the story of their firm's founding and history up to the present time; (c) their future goals and expectations; and (d) the story of each person they had hired, from the decision to bring someone in, through hiring, to any changes in the person's job or employment status. Founders were generally able to provide a great deal of detail about all four of these areas.

In addition to founders and senior managers, short interviews were conducted with 41 employees across the firms (several employees had worked for more than one firm in the sample, and at least two had worked for three sample firms). The substance of each conversation and pertinent verbatim quotations were documented in extensive field notes transcribed immediately after each interview. These notes are several hundred pages long and they are supplemented by a variety of exploratory codings, tabulations and brief written summaries. The coding of the data was typically cross-validated by the person conducting the interview and at least one other person who did not participate in the interview, but who coded from the written interview transcripts and other written documents (Brenner et al., 1985; Miles and Huberman, 1994; Denzin and Lincoln, 1998).

The notes contain extensive data regarding how people in the sample came to found their firms and about planning and decision-making processes. These data were ancillary to the primary research questions of the original study but are central to our current focus on processes of improvisation in entrepreneurship. Data from the supplementary samples were gathered through formal pilot interviews, direct observation, informal discussions with members of founding teams and unstructured and semi-structured interviews. Data on the business-to-business software firms were systematically compiled and retained. Some observations concerning the faculty scientist knowledge-based start-ups were recorded in the context of ongoing

Table 1
Data Sources and inductive processes

Data source	Initial inductive process	Inductive processes for this study
Primary: Participant observation and interviews with founders and employees of 25 computer training and air pollution consulting firms, review of company and public documents. Originally conducted as part of a study of job creation and change in young knowledge-intensive firms.	*Original study*: Data were coded independently by person conducting the interviews and observation and by one or more members of writing group which met weekly. Coding and interpretations were discussed weekly. Ambiguities, contradictions and insufficient data resulted in follow-up phone calls and return visits to the firms. Each week, interpretive write-ups of the data were reviewed and critiqued by members of the writing group, who were asked to actively challenge the author's work. In addition, one set of field notes and initial interpretive write-ups were submitted weekly to a formal seminar in qualitative methods and critiqued by the instructor and/or members of the class.	Original codings were maintained and mapped onto constructs used in this study. For example, prior codings indicated whether a firm founding was preceded by a plan, and also indicated whether a founding resulted when someone else delivered an opportunity to which a founder then responded by starting a firm. Although the original study did not intend distinctions between improvisational and DPE foundings, such prior codings mapped directly onto the new constructs. The authors discussed the data and codings for approximately 50 h over an 11-day period.
Supplementary-Software Company: Structured and unstructured interviews with and completion of draft questionnaires (in some cases) by founders and managers of a convenience sample of 21 business-to-business software firms.	*Original study*: Data were used to develop and improve questionnaire items as part of an ongoing study of start-up human resource practices. Responses from founders and managers were used to create, edit and evaluate a series of 108 open and closed-ended questions on founder background, founding processes and the emergence and change of human resource practices.	Data from the original study were used to interrogate, challenge and sometimes illustrate inferences drawn from the Primary sample. The authors first described a series of inferences based on the Primary sample and then asked whether these inferences were supported by the software company supplementary data. The supplementary data caused the authors to reject approximately one-fifth of the original inferences, and to alter another fifth. For most of the remaining inferences, these data proved not to be pertinent. Because the original software company data were not created in a systematic or consistent manner across the software firms, no inferences were drawn from cross-firm patterns.
Faculty Scientist Supplementary: Encounters with a convenience sample of 22 faculty start-ups during 6 years across five universities.	These observations took place in individual professional interactions or in the context of organizing applied seminars, rather than as part of a particular research project.	These data were used—in a manner analogous to the software company data—to interrogate the inferences which emerged from our initial inductive consideration of the primary sample. These data did not lead us to reject any of the inferences developed from the primary sample, but deepened our understanding of underlying processes and provided several useful illustrations.

policy work, but many were not formally stored as part of a formal research process. In some cases, these data were obtained over repeated interactions in professional contexts, with corroborating data from other observers or archival data.

For this study, we reviewed the interview transcripts and summaries for our primary sample, asking questions about the existence or nature of improvisation, rather than the original focus of that research. It quickly became apparent that the exploratory quality of the original interviews had surfaced rich and systematic data regarding improvisation processes in start-up firms. This study reanalyzes these data through the conceptual lens of improvisation. We also considered available information on the software design firms and university scientist start-ups, contrasting and challenging apparent similarities and differences. We rely most heavily on the primary sample of 25 computer software and environmental consulting firms, using the supplementary sample of faculty scientist start-ups to interrogate and generate contrasts between the processes through which business professionals and scientists found firms. We use the supplementary sample of business-to-business software firms primarily to challenge and corroborate the patterns we observe in the other samples, especially the primary sample.

The fact that none of the data was collected with the goal of studying improvisation increases the probability that the patterns observed reflect genuine patterns in the founding process rather than our own expectations. The possibility of retrospective bias by informants is a potential threat to the quality of our data. However, because we studied young firms and because we asked founders to describe specific events without providing them a framework with which to evaluate and interpret their answers, we believe that retrospective bias is minimized.

2.3. Concepts

Although our method was inductive, we began our study with a general description of the basic features of improvisation. Following research across disciplines (Weick, 1998), we focused on the extemporaneous quality of action as the distinguishing feature of improvisation. Specifically, we built on Moorman and Miner's (1998b) definition of improvisation as "the degree to which composition and execution converge" (p. 698). This definition implies not only a temporal convergence, but also a substantive convergence of action creation (design or composition) and implementation (execution) (Miner et al., 2001a,b). In pure improvisation, "... the acts of composing and performing are inseparable" (Bastien and Hostager, 1992, p. 95); "There is no split between composition and performance; ... no split between design and production" (Weick, 1993b, p. 6). Design (creation) and execution (implementation) of an activity not only occur at the same time, but shape and influence one another. The word "composition" in Moorman and Miner's (1998a,b) definition also implies that improvisation involves some degree of novelty, rather than following existing routines, and some degree of intentionality, rather than representing random deviation from prior routines (Berliner, 1994; Hatch, 1997; Weick, 1996, 1998).

Although this study contrasts improvisation—the convergence of design and execution—with behavior in which design precedes execution, these two patterns are not exhaustive of behavioral possibilities: improvisation is not the negation of design–execution. Rather, founders facing challenges or opportunities may enact at least six general behavioral alternatives: (1) they may do nothing; (2) they may engage in more or less random behavior; (3) they may invoke previously acquired routines; (4) they may engage in design or planning; (5) they may execute a prior plan that preceded execution; and (6) they may improvise.

Most theorists suggest we can distinguish varying degrees of improvisation, sometimes on more than one dimension (Weick, 1993b; Hatch, 1997). In music, some improvisation represents embellishments on a relatively unchanged arrangement, while other improvisation departs more radically from prior compositions. Similarly, organizational improvisation can include different proportions of unscripted action, different degrees of radical innovation, and different levels of irreversibility (Miner et al., 2001a,b). In this study, the data allow us to investigate the existence and characteristics of improvisation, but not its degree. Additionally, although it is probably correlated with other important processes, improvisation can be conceptually distinguished from several distinct but related constructs. For example, it is distinct from adaptation, learning, creativity and innovation (Moorman and

Miner, 1998b). Appendix A outlines these distinctions as well as others we develop in this paper including bricolage (Levi-Strauss, 1966) and effectuation (Sarasvathy, 2001). Finally, theorists have argued that skillful improvisation typically draws on both procedural (know how) and declarative (know what) organizational memory (Moorman and Miner, 1998a,b).

In the next several sections, we develop several inductive propositions, describing data and patterns that led us to propose each of them. We note several ties to existing theories, but save further development of these ties for Section 4.

3. Findings

3.1. Improvisation in founding

The first question we addressed was whether the founding process could represent an improvisational activity. For many firms, the process clearly was not improvisational. Some founders described founding as a relatively well-structured process in which they envisioned a plan against which they subsequently attempted to execute. However, we identified one category of foundings that equally clearly do not fit the DPE model. In these cases, the founders' descriptions of the founding process suggest strongly that design and execution were experienced as largely indistinguishable, embodying a substantive convergence of design and execution. For example, one woman who created a business serving her prior employer's (PE's) customers described the founding of her firm "Anyway, I wanted to go back to North Carolina, and the company agreed to lay me off. They asked me to finish up some project work I was doing on their contracts. I was doing PE's projects and looking for other work and I swear I didn't intend for this to happen, but the people I was doing work for started giving me contracts. I didn't agree to violate any of the agreements they had with PE or anything, but they started wanting to do follow on work with me, and I started doing contracts with people I had done business with while I was at PE. I really never intended to take their customers to start a business on my own, but it just happened." Clearly, some design was taking place—for example, she was careful to avoid violating existing contracts—but this design converged with the process of winning customers and starting her firm.

In the most common case, future improvisational founders were working as employees of another firm when opportunities became clear during interactions with that firm's customers. As one environmental consulting founder put it,

> They were unhappy with the overall service they were getting from the firm, but they had a good relationship with me and my work. One day their chief engineer comes to me all pissed off and, well first I think he's mad at me and then he says something like 'Why do you work for these people? No one can deal with them. We'd much rather just deal with you.' And he told me they'd front me the money to buy my own equipment and guarantee me enough work to keep me busy for at least the next year.

Two weeks later, he began operations in his own firm, immediately selling services to the previous client, and sub-contracting other work from his prior employer.

In another example, the head of a computer training and consulting firm decided to stop selling a suite of services that had generated only a handful of customers. The project manager who had developed the services argued forcefully that this line of business could be successful. The owner of the firm told the project manager—whose employment at the firm was not at risk—that if the project manager wanted to, he would be permitted to take the service and the existing customers and start his own firm. The project manager decided on the spot to start a firm, and on the following Monday was operating a new business out of his house.

In a case with something of an odd twist, the idea of starting a business came indirectly from a conversation with a customer. Roger decided to start his own firm when he discovered that some of his customers *already* thought he was running his own business. Roger was unhappy with his current job, but had been trying to figure out how to improve his job or find a new one, rather than planning to start his own firm. "I was doing everything myself—I was selling the work and doing the work... I was traveling all the time, working 70 or 80 h and getting paid for 40." His moment of illumination came during a project planning conversation with a large customer. The customer had always called him either "at home or on my SkyPage" and apparently assumed there was no other office. Invoices were paid to a P.O. Box. During the conversation, Roger mentioned his employer, and the customer was astonished to learn that Roger worked for someone else's company—they had thought all along that he was independent. Roger acquired his own pager, resigned from his job and was in business for himself less than 1 week later, providing services to several of his old employers' customers.

We found, then, a set of firms that were not founded through a process involving design or planning followed by execution. Typically, the founding process for these firms unfolded during ongoing interaction between the founder and current customers, suppliers or associates during which the founder recognized some "seed deal" as an opportunity to found a firm. In these foundings "design" of the new business occurred at the same time the first implementation steps were being taken. All firms emerging from initial seed deals sprang up less than 6 weeks after the initial offers were made. In many cases, the founding took place in less than 1 week, or even over a weekend: "I left there on Friday, and had $45,000 worth of purchase orders on my desk Monday morning." Or in another case: "I took the $6,000 I had in EPA retirement, and Bobby put in some money, and we started... Two weeks later, we were in a parking lot just down the road, splitting $11,000 (their first revenues) between us: twenty for you, twenty for me ... we've been in the black ever since." Founders spent the short time between leaving jobs and starting firms fulfilling obligations to their employers, looking for office space, buying or borrowing equipment, telling people about the business and starting to recruit employees. In no case did a founder describe a primary focus on a plan or market analysis or even thinking through the new firm's overall design or strategy. Founders just started moving toward creating their businesses, improvising their way to entrepreneurship.

Of the 25 environmental consulting and computer training firms (Table 2, rows 1 and 2), the data allow us to distinguish eight (32%) which match the DPE model. This does not mean that the plans were accurate descriptions of the firms that followed but rather that the founding process did begin with a plan and an expectation that this would guide future action. The remaining 17 firms (68%) were founded in quick response to opportunities that became apparent to future founders through conversations with colleagues, suppliers or customers. We labeled these foundings improvisational. Their design and execution processes approximated temporal and substantive convergence: design and execution happened at about the same time, and were experienced as a single, inextricably interwined phenomenon. It is important to note that the seed deals to which improvisational founders responded did not represent designs that founders could adopt, merely concrete opportunities they recognized and tried to exploit.

Table 2
Improvisational versus design–execution foundings

	Improvisational	Design–execution
Number	17	8
Percent of sample	68	32
Number in new line of work	2	4
Percent in new line of work	11.8	50

In two of the foundings we have labeled improvisational, the founders had previously started other firms. Arguably, foundings subsequent to the first might be described as neither DPE nor Improv, but as invoking an entrepreneurship routine. Our data do not allow us to rule out this possibility. However, in both the cases, the founding business models for the new firms differed substantially from the old. We are not convinced that it is appropriate to label the processes which produced very different firms at different times a "routine."

Improvisational foundings occurred in scientists' start-ups as well. In some cases, faculty researchers were engaged in research funded by existing large firms and were doing work of visible value to those firms. For example, a faculty member was supervising basic research on material composition funded by a major industrial firm. For the firm, this research helped to diagnose key features of their materials in ways critical for product performance and safety. The industrial firm asked the professor or graduate students if they would sell some of the software and instruments directly to the client.

Stimulated in part by this conversation, the professor and graduate students started a company to produce more finished versions of the diagnostic tools and sell them more generally. The team did not attempt to design their business before beginning its execution, either formally or informally, or to systematically survey the potential market for the device or make long-term plans for production. Instead, they began by personally building a few testing devices, selling some of them and related software to their industrial partner and informally letting other researchers in the field know they would produce instruments for clients. In some cases, scientists' founding improvisations came from interacting with research partners in applied research. In others it came after the expression of interest by an external party seeking to license an invention.

As was the case with the firms in our primary sample, some faculty scientists did follow a design–execution model in which the original intention was to found a firm, and the founding team engaged in search and planning activities. One faculty member, for example, reported that he had already received many patents, international recognition, and millions of dollars in grants, all of which had now become boring to him. He deliberately set about learning how to start a firm and collected information on which of the many potential applications of his inventions to commercialize. Another professor with ties to many firms and eager to encourage faculty start-ups, went so far as to begin holding seminars on how to protect intellectual property and other start-up planning topics. In many cases, however, faculty scientist teams did not deliberately undertake searches to explore markets for their potential products or to make deliberate plans for their emerging businesses.

Founding processes are of fundamental strategic importance, because they determine the overall posture and positioning of a new firm (Quinn, 1980; Boeker, 1989). Improvisation is therefore strategic when it strongly influences founding processes. Overall our review of the primary sample of environmental consulting and computer-training foundings, along with the sample of scientist founders leads us to conclude that improvisational foundings may be quite common.

Proposition 1. *Improvisational foundings are a commonplace occurrence in knowledge-intensive start-ups.*

3.2. Improvisational tactics and the emergence of strategy

Our first proposition focused on strategic improvisation in the founding process of new firms. However, we also observed improvisational activity in our sample that was not originally oriented towards strategic issues but toward day-to-day tactical concerns. Therefore, the second question we addressed was whether tactical improvisation influenced firm strategy in any important or interesting way. We discovered one process through which tactical improvisations sometimes shaped strategy: when founders invoked previously improvised tactics *as if they were strategies* while providing legitimating accounts of their firms to potential resource providers.

Founders in our sample were called upon frequently to create interpretations of their firms and their firms' activities in response to demands placed upon them by outside providers of various resources, including customers, financing and employees. For example, several of the environmental consulting firms had at one time or another attempted to gain additional business with the US government. The very process of bidding these contracts forced the firms to analyze and document their proposed activities in a plan.

In one such example, an environmental firm with four employees was providing services in three distinct areas. The third of these areas—smokestack emission analysis—had been improvised as something of a lark—as a tactic temporarily providing some "billable hours" when one of the employees had been allowed to follow a personal interest during a prior slow period. The founder had been reluctant to enter this somewhat "dirty" line of work, in part because "the zoning for this building (where they leased space) does not really accommodate the kind of equipment and solvents we had need to use." A short time later, he heard about a contract that would support 18 employees doing smokestack emission work. The founder decided to pull together a bid very quickly—not because it fit with some overarching strategy—but because the EPA had structured the contract as a small business set-aside, and the founder figured there would be little competition.

The bidding process required that the founder specify how he would support the higher level of employment (and even to provide the names of some of the employees who would be recruited to key positions) were the deal awarded. The bid that the firm submitted fictionally presented the firm as if it was already committed to the line of work the EPA needed done. It described the firm's current activities and staffing, *ignoring* work in the other two areas, yet described the four current employees *as if they were dedicated to smokestack work.* The bid stressed the firm's successes in the emission analysis area and described in detail how each employee would contribute to success on the contract, were it awarded. The contract was awarded, and the firm abandoned its other lines of work and staffed up to focus on the work the bid described. The intendedly temporary tactical improvisation became the firm's primary strategic thrust.

Like the founder above, some founders seemed to know that they were, in the words of an ex-EPA employee, "playing pretend" when they gave accounts of their firms that legitimated past tactical improvisations as if they had been parts of a coherent forward-looking strategy. Nonetheless, for many founders, the very process of "publicly" interpreting their firms' short past and present in terms of how these might fit into an envisioned future seemed to help to shape their own sense of their firms' emerging strategies. In our business-to-business software sample, we were told the story of how one firm got into the consulting business. The firm had tried unsuccessfully to get one of its existing customers to provide access—for software product sales—to a much larger firm with which the customer was in an alliance. During a face-to-face sales call to the existing customer, our contact decided to try a new approach of establishing a relationship with the larger firm. He proposed a joint venture in which his firm and its existing customer would jointly sell consulting services. He suggested strongly that the joint venture target the much larger firm for its first sale. The existing customer turned down the joint venture opportunity. However, the process of trying to sell this customer on the idea of the venture convinced our contact that the consulting business made sense, and his firm went on to build a successful line of consulting work.

The process of giving public accounts during attempts to get resources often required such face-to-face discussions in addition to the creation of plans and other documents. For many entrepreneurs, the reality of the business emerged from the process of playing pretend while giving accounts in search of legitimacy among resource providers. This process of face-to-face social construction was particularly striking when entrepreneurs were attempting to recruit junior employees during the firms' early days (Baker and Aldrich, 1994). Founders described how they had to tell some of these recruits stories they made up on the fly to make their fledgling firms seem comfortable and normal—that is, legitimate—to potential employees with visions of large firm structures and processes in their heads. Several also described how the stories they told and the conversations they had with these recruits became part of employee expectations and the emerging culture of the organization after the people joined the firm. For example, one founder told an uneasy recruit on the spur of the moment that he envisioned the firm as a "family" and that he was concerned with peoples' general well-being, not just their work performance. The story worked well, and he repeated it to other employees. He said this later came to haunt him when during a difficult period he felt constantly interrupted by a steady stream of employees coming to talk to him—not about their work, but about their feelings. The improvised social construction of the firm as a family—accomplished through face-to-face conversational construction of legitimating accounts—had become a taken-for-granted fact that constrained the founder's future behavior and human resource strategies (Berger and Luckmann, 1967).

More generally, processes of creating accounts to interpret what the firm has been in terms of what it might become are sometimes rendered into obdurate constraints when a founder actually obtains a contract, financing or a desired employee. Recall the example above of the firm that reluctantly improvised a little smokestack work, then became a focused smokestack emissions analysis firm when they won the small business set-aside from the EPA. Another environmental consultant founded his firm to do a specific sort of water pollution research, because he was passionate about spending time outdoors in marine estuaries. He had, however, learned in graduate school how to run an air pollution simulation device invented by his advisor. At his advisor's personal request, he bid on a small contract to teach some other people how to use the device. When the contract came through, it allowed him to obtain an equipment loan to purchase the device. Four years later, most of his business is in air pollution testing, creating improvements to the simulation equipment, and teaching a broad spectrum of people how to use it and similar machines. He still expresses a desire to return to the estuaries but expects that this will come only with (what he hopes will be early) retirement.

The process we have described somewhat resembles descriptions of retrospective sense-making through giving public accounts (Elsbach, 1994). This type of retrospective interpretation and creation of new patterns has been observed in new product development (Miner et al., 2000) and other contexts (Weick, 1993a; Preston, 1991). The crucial feature of this process here is that the improvising team observes its own partially completed improvisational activity and makes sense of it in a way that shapes ongoing activity. The improviser interacts with the ongoing products of improvisation to shape the continuing design as it is improvised.

Similarly, in our sample, founders looked upon what their firms had done and made sense of it, filling in holes and de-emphasizing pieces that might not fit. There are, however, two main differences in the process we observed. First, the sense-making takes place explicitly in a contingent, forward-looking process. The founders made sense of the past in the context of a future that was avowedly uncertain. Second, the process we have described is largely not psychological or driven by internal needs. Instead, the retrospective sense-making was driven by exogenous demands by external resource providers for founders to provide accounts that make their firms appear like legitimate investment opportunities, suppliers or customers. The outcome of these processes was a taken-for-granted set of assumptions about what the firm is and does which, in some cases, establish a set of enforceable claims on the firm to maintain the strategy that the required accounts have described.

Some of the processes we describe have long been noted by careful observers of how entrepreneurs actually create firms in many settings. For example, Aldrich and Fiol (1994) also argued that legitimacy-seeking entrepreneurs are frequently called upon to create interpretations of their firms and their firms' activities in response to demands placed upon them by outside providers of various resources (Aldrich, 1999; Aldrich and Baker, 2001).

One way to conceptualize the total sequence of events is that the tactical improvisations represent variations in behavior originally related to very local, immediate problems and opportunities. The periodic external demands for future-oriented accounts serve as triggers for the selection of some prior activities over others, which then are replicated because they become embedded in formal, public plans and relationships with resource providers. This pattern of variation, selection and retention—and resulting path dependence in strategic action—is characteristic of evolutionary models of firm change over time (Miner, 1989, 1994; Aldrich, 1999; Nelson, 1995).

Proposition 2. *Externally-demanded future-oriented accounts of prior improvised tactics shape firms' future strategies.*

3.3. Network bricolage

Our first two propositions examined two processes through which improvisational processes affect strategy: through founding processes, and when providing public accounts transforms tactical improvisation activity into firm-level strategies. However, while such *resource-seeking* behaviors help explain one mechanism through which tactics rose to the level of strategy, we observed many instances and domains in which the founding teams did not search broadly for, or plan in advance for specific resources, but rather drew on resources readily at hand. Making do with current resources, and creating new forms and order from tools and materials at hand has been defined as "bricolage" by anthropologists (Levi-Strauss, 1966) and the concept has been adopted by improvisation theorists and others (Chao, 1999; Innes and Booher, 1999; Weick, 1993a).

There has been debate over whether bricolage should be included in the definition of improvisation (Moorman and Miner, 1998a,b). Many have noted that when creation and execution occur at the same time, there is little ability to plan ahead to obtain materials for an activity and little time in which to procure resources once the need for them is identified. Thus, the occurrence of improvisational activity seems to imply that bricolage will occur. However, behavior following a DPE model may also make use of bricolage. For example, we might plan to hike, and intend to build a campfire *making use of whatever materials are at hand* when we make camp. Logically, then, improvisation implies bricolage, but bricolage does not imply improvisation. They are not the same construct (Appendix A). Our third broad question focused on bricolage during founding processes and the early days of start-ups in our sample.

Across our samples, founders made use of an extraordinarily broad variety of means and resources at hand during and after founding: they engaged in bricolage with regard to customers, financing, suppliers, office space, advice and employees. However, founders' comments suggested that they relied on their pre-existing networks as their primary means of access to the welter of resources needed during and after founding. A recurring and common theme across this great diversity of bricolage was the role of personal and professional networks *as the means at hand*. We label dependence on pre-existing contact networks as the means at hand *network bricolage.* This construct provides the primary lens through which we examine bricolage during and after founding. The resource-seeking contrast to network bricolage is attempting to find new useful network contacts, for example, by "networking" or seeking opportunities and other resources through people who were previously strangers.

Proposition 3a. *Founders' bricolage activities are strongly shaped by the contact networks in which they are embedded.*

We first focused on the initial founding process, and on bricolage toward one particular type of resource: the opportunity around which the firm is founded. In other words, we examined whether founders had taken advantage of opportunities at hand to found their firms, or whether they had engaged in a search for new opportunities.

As described above, many cases of improvisational founding involved network bricolage with respect to founding opportunities. We observed improvisational foundings that took place when founders discovered opportunities to start businesses—without searching for them—during conversations with people they knew from their current or prior jobs and responded to these opportunities by simultaneously designing and executing firms that exploited the opportunities at hand.

This contrasts strongly with our DPE foundings, in which bricolage occurred, but seemed much less common. Others have noted that when founders follow the design–execution model of the founding process, the desire to start a business is typically followed by a search for opportunities rather than an idea for a business leading to the decision to become a founder (Brockhaus and Horwitz, 1986). We observed this pattern in our data. For example, one DPE founder in our sample grew tired of the heavy equipment business and as he thought about what else he might do, he noticed two things. First, editorials in his local paper complained that students in the local school system were not getting enough access to computers and training on how to use them. Second, he noticed a proliferation of advertisements in the paper for computer training for adults. He decided that he could take advantage of the training available for adults and improve his computer skills enough to feel comfortable founding a business that travels from school to school, giving kids in poorer school districts access to computers and training. Another DPE founder, previously a restaurant manager, went searching for a "good franchising opportunity." Eventually, he settled on the computer training industry, but instead of becoming a franchisee, carefully studied and then copied an existing franchise model. A frustrated research and development scientist in a manufacturing firm read a story about increasing levels of industrial spending on air quality issues, and undertook market research that eventually led him to start an environmental consulting firm.

In such DPE cases, explicit and extended search processes led to the discovery of opportunities in industries or lines of work with which the founder has no prior experience and few if any prior connections. These founders engaged in resource-seeking rather than bricolage with respect to founding opportunities; they actively sought out opportunities that were not at hand. When their searches uncovered opportunities, they planned and then created businesses around them, seeking customers and alliances among people who were strangers to them. Two DPE founders joined organized "networking" groups prior to founding businesses; one found his partner this way. Other DPE founders engaged in search processes, but discovered and created firms around opportunities in their current industry. However, we also observed DPE founders who engaged in bricolage with respect to founding opportunities. One trainer and one environmental consultant were offered opportunities through conversations with work contacts but engaged in careful research and planned for a number of months before founding firms around the initially proffered opportunities. In summary, while all of our improvisational foundings involved bricolage with respect to founding opportunities, three-quarters of our DPE founders searched for opportunities, and one-quarter engaged in bricolage, exploiting an opportunity at hand. Moreover, across both Improv and DPE foundings, when briocolage occurred, the founding opportunities were at hand because they were made available through conversations with members of founders' professional networks: in each case we observed, bricolage during founding was network bricolage.

In striking similarity to the professionals who Granovetter (1995) described as finding new jobs without searching for them, founders' networks provided information and resources even in the absence of any effort on the part of the founders to search for the deals around which they built their firms (Kirzner, 1997). Because the opportunities were generated through improvisational founders' personal networks, they were unlikely to involve a line of work very different from what the founder had already been doing as an employee (Granovetter, 1995). In contrast, search processes—such as those used by some DPE founders—were more likely to generate a broader set of opportunities.

Our primary sample provided support for this pattern (Table 1, rows 3 and 4). Of the eight design–execution model foundings, four (50%) involved completely different activities than the founders' prior lines of work. In contrast, only 2 of the 17 (11.8%) of the improvisational founders made drastic changes in their lines of work. In Section 4, we explore connections between this pattern and the literature on "knowledge corridors" (Nelson and Winter, 1982; Shane and Venkataraman, 2000; Venkataraman, 1997).

Proposition 3b. *Improv founding processes are more likely than DPE founding processes to involve network bricolage with respect to founding opportunities.*

Proposition 3c. *Network bricolage is more likely than the search for founding opportunities to result in a new business in a founder's prior industry.*

In addition to discovering founding opportunities through their networks, founders made active and instrumental use of their networks after start-up. Recruitment and selection of employees was an important example of network bricolage. We have good comparative data on the source of the first four employees (or fewer for firms with under four employees) for most of the primary sample firms. This amounts to 69 employees in total.

Table 3
Levels and sources of early employees

	Network	Impersonal	Total
Senior	17	1	18
Junior	19	32	51
Total	36	33	69

Table 3 describes the pattern of early hires and the sources founders used to find and recruit these early members of their firms. Founders relied very heavily on their personal networks for bringing early employees into their firms, actively seeking out new employees from among people they knew from their prior employment either in customer–supplier relationships or as co-workers. Of the 69 early hires for which we have data, 36 (52%) were hired through personal networks (direct contacts or contacts of contacts). The rest were hired through impersonal mechanisms, usually newspaper advertisements or on-campus recruiting.

A typical pattern during the early hiring process was for entrepreneurs to attempt to hire relatively senior people and to hire them quickly in order to be able to execute the operational requirements of their deals—whether these were seed deals, or business gained after founding (Baker and Aldrich, 1994). Perceived need for speed and for senior employees combined to intensify reliance on personal networks. Of the 69 early hires, 18 (26%) were senior hires, 17 of these 18 (94%) were from personal networks. Only one senior person was hired on an impersonal basis. In contrast, of 51 junior hires (74% of total), only 19 (37%) were hired through network contacts, while 63% were impersonal hires.

Network bricolage in recruitment was also prevalent in the faculty firms. Scientist founders often hired their own graduate students and academic staff members from their university laboratories as early employees. Again, the founding team's professional network shaped what "materials" were readily available and trusted. Scientist's networks appeared to be less rich in business skills and resources than the networks of founders in the primary sample. Thus, early network bricolage sometimes resulted in a narrow set of employee values and skills that the founding team later came to see as creating challenges for meeting business goals. One founder noted wryly that because he had drawn on his prior students and academic researchers, no one in his firm knew about basics of marketing, consistent production processes or workplace coordination routines for an efficient production process. Nonetheless, this scientist continued to rely on his existing personal and professional network—the resources at hand—for recruitment.

More generally, during their firms early days after start-up, founders frequently scrambled to draw on whatever other resources were easily available to them. In most cases, they turned to their existing network, whatever its limitations. Stories of borrowing office space, equipment and money from friends and prior employers were very common in the primary sample. For example, one new founder spent her first six months using the telephones, computers and office space that she borrowed from the customer who gave her the seed deal. It was only when she needed to house employees who were training one of her first customer's competitors that she finally moved into office space of her own. In other cases, the resources went beyond physical and financial resources to include business practices and help with solving various problems. As one founder described, he had a "standard set of people I go back to over and over again for advice and to discuss things ... some of them are pretty bad models."

We expected that network bricolage during founding would indicate a "better" set of network contacts, and would therefore predict higher levels of post-founding network bricolage. Because Improv foundings were characterized by network bricolage more frequently than were DPE foundings, we expected that Improv foundings would show higher levels of post-founding network bricolage as well. Moreover, because founders who searched for opportunities were more likely to end up in different businesses, we expected their prior contacts would simply be less directly useful to their new firms.

Contrary to our expectations, the pattern of post-founding network bricolage appeared to characterize the DPE foundings to as great an extent as it did the Improv foundings. This pattern encompassed various types of resources and network contacts. For example, both types of founders generally approached someone they knew rather than a banker or other financial intermediary if they needed to raise money initially. When they approached bankers, they frequently either went first to the bank that initiated their home mortgage, or sought an introduction to a banker from someone they knew. Improv and DPE founders both relied heavily on pre-existing network contacts for business development.

Proposition 3d. *Firms founded through Improv and DPE processes are equally likely to engage in post-founding network bricolage.*

3.4. Improvisational competencies

Without using the term improvisation, researchers have drawn on qualitative studies to suggest that some firms maintain stable patterns of improvisation and use routines that enhance the chances their improvisational activity will produce effective outcomes in the short term (Quinn, 1980; Pascale, 1984; Mintzberg and McHugh, 1985). Our final question focused on improvisational competencies, by which we mean firm-level routines and capabilities that enhance the chances the organization will generate fruitful improvisations and/or harvest them for further activity.

At first blush it seems counter-intuitive that firms could have routines for improvisation, or could have competencies in improvisation itself. Prior observation has suggested, however, that firms and groups may sustain practices and routines that make it more likely improvisation will occur, that it will be fruitful, and that the value of the improvisation will later be harvested. Miner et al. (2001a,b), for example, found that one of two firms doing product development that they studied over 1-year-long period had developed improvisational technical capabilities in product development. The other firm had explicit organizational-level competencies in eliciting what they regarded as good product design improvisations from their product development teams.

The fact that improvisation itself was a frequent activity in the knowledge-based start-ups does not imply that the firms had good improvisational competencies. The concept of improvisation is frequently equated with *competent* improvisation. However, just as design and execution may be separately competent or incompetent, so may be improvisation. We asked ourselves whether these knowledge-based start-ups revealed improvisational competencies of any sort and, if so, how did it affect the founding process and firm strategies?

In our primary sample we observed two particular types of improvisational competencies, problem-driven and opportunity-driven. Most of our observations of problem-driven competencies came from our business-to-business software sample. We shall describe one case in particular, although we heard several similar stories. The founder of this company had previously owned another software firm and was very knowledgeable about "best practices" in software design and execution. But, when the owner of a rapidly growing telecommunications service firm approached him and said that he needed a solution—any solution—to a big problem with stolen service, the founder made the decision to pull together quickly a team of the most talented software engineers he could find and let them just "go at it," building a solution as fast as they could. There was no structure to the coding, no documentation and no quality control.

The solution worked, more or less. It was, as the founder had expected, full of bugs. It only worked about 70% of the time, but this was good enough to make the product and the online services it supported very popular. Demand for the services grew rapidly. Meanwhile, part of the team that built the software became known as "the troubleshooters" and, in the founder's description, were nothing short of folk heroes in the firm. Their work was dominated by the daily need to improvise the performance of the system. Something would break, and the troubleshooters would call on a growing repertoire of patches and workarounds to make it perform as well as or better than before. They were able to deal effectively enough in an improvisational manner with the almost daily catastrophic failure of the system that customers were often unaware that anything had gone wrong.

Unfortunately, as the firm grew and expanded its product line, reliance on the troubleshooters (who grew in percentage terms more quickly than the rest of the firm) became part of the routines of the firm. According to one early manager "It became known very deeply—even by people who didn't like it—that what we were good at was getting crappy code out there very quickly, and then making it run well enough that it looked like it wasn't really a piece of junk."

In our observation of founding processes, we also saw opportunity-driven improvisational competencies. Founders displayed improvisational competencies when they successfully responded to and exploited opportunities by rapidly cobbling together a start-up around seed deals. Again, the early presence of an improvisational competency reduced or eliminated efforts to build design–execution competencies in similar areas. For example, in our primary sample, only 4 (24%) of the 17 founders who formed their businesses around seed deals ending up making any early hires to accomplish sales tasks, while four of the eight founders (50%) who did not build their businesses around seed deals hired sales people. It would seem that the ability to get an early deal without prior planning reduced efforts to build design and execution competencies when obtaining future deals.

Not surprisingly, many of the faculty start-ups showed strong improvisational competencies in technical problem-solving and creative customization of technical products. They made up the solutions as they went along, through real-time interaction with their clients. A bench scientist whose graduate students produced saleable research instruments on weekends, for example, did not write any protocol for production or design. No attempt was made to structure these one-off solutions into a coherent set of products or to think about the overall market they might serve.

Instead, the students sometimes designed the custom devices literally as they produced them, often in a hurry so that the "final performance" of the machine was occurring as they designed it. The faculty founder relied on the scientific ingenuity of the firm to generate solutions to unexpected problems and opportunities. This improvisational competency seemed to make it less likely that firms run by scientists would develop competencies at "productizing" their solutions—designing and executing them as general purpose solutions valuable to more than just the client or customer who made the initial request for customization.

We interpret these cases as suggesting that when a firm develops strong improvisational competencies in particular areas; these Improv competencies retard the development of DPE competencies in the same areas.

Proposition 4. *Improvisational competencies can reduce the likelihood the firm will develop design-precedes-execution competencies in the same activities.*

4. Summary and discussion

This study has investigated the existence, channels and implications of strategic improvisation in knowledge-intensive new businesses. Taken as a whole, our field observations of the primary and supplementary samples pointed to a rich fabric of processes, many of which matched descriptions of organizational improvisation and constructs shown to be related to improvisation in previous studies. We identified two ways in which improvisation can affect start-up strategies, and described how the giving of public accounts to resource providers can shape how firms select among prior tactical improvisations, turning improvised tactics into enacted strategies. We also discovered patterned relationships between improvisation and bricolage. We introduced the construct of "network bricolage," defined as "dependence on pre-existing contact networks as the means at hand." Our analysis of bricolage turned up several surprises, suggesting that network bricolage shapes founding industry and that the Improv-DPE founding distinction may not predict later differences in improvisational activities. Finally, we found improvisational competencies and showed that they sometimes crowd out the development of DPE competencies. In this section, we first consider strengths and limitation of this study, and their implications for future research, and then discuss implications of our work for theories of improvisation, bricolage and entrepreneurship.

4.1. Strengths, limitations and implications for future research

We observed these general patterns in our small, but complete, sample of firms conducting environmental consulting and computer training in one local region. This primary sample means we observed an entire population of firms, which increases confidence that our observations were not the result of an idiosyncratic sample of firms within a population. We also drew examples from non-probability samples of software firms and firms started in a variety of industries by scientific faculty members at several universities, which helped provide corroborating evidence that the activities we saw were not idiosyncratic to the primary sample.

All of the firms we observed were "knowledge-intensive," by which we mean they share in common the marked importance of human capital and relatively low capital intensity. This feature of our samples strengthens our confidence that our findings may be generalisable to other knowledge-based firms. However, this sample feature also makes it more likely that founders would have the opportunity and the ability to improvise new firms. Most of the new foundings we studied initially required few resources beyond founders' own capabilities and resources readily available through their networks. Further research could fruitfully examine the sensible idea that less knowledge-intensive and more capital-intensive industries would find improvisational foundings and use of network bricolage to be somewhat less common. However, our other findings—the role of improvisation in determining start-up industry, of account-giving in promoting improvised tactics to the level of strategy and of improvisational competencies in limiting the development of other competencies—may generalize more directly to different samples. This, too, merits further systematic investigation.

This study is inductive and exploratory, building on several small samples of knowledge-based firms to generate hypotheses regarding improvisation and the founding process more generally. As with all such studies, the generalisability of even our tentative findings must be viewed with care, and systematic quantitative research to test our hypotheses will strengthen the contribution of the work.

4.2. Implications for research on improvisation

This effort extends recent work that explicates specific sub-processes in improvisation, and explores its potential impact on other processes and types of organizational outcomes. Consistent with much prior work, our findings paint improvisation as occurring in several domains, and potentially creating both harmful and beneficial outcomes (Hatch, 1997; Crossan, 1998; Miner et al., 2001a,b). Our work provides important empirical evidence that organizations may improvise in ways that involve and generate new strategies, going beyond simple tactical improvisation in pursuit of pre-existing goals (March and Olsen, 1976; Mintzberg and McHugh, 1985). Although prior work has provided examples of strategic improvisation (Pascale, 1984; Mintzberg and McHugh, 1985), these studies described projects or products of existing firms, leaving open the possibility that improvisational outcomes remained at the margin of the firm's basic strategies. Our finding of improvised foundings suggests improvisation can lie at the very core of firm strategies.

An important question concerns the distribution of improvisational activities and competencies within firms. Most prior work (Miner et al., 2001a,b) has focused on improvisation in established firms, often within well-defined functional areas. But as young firms grow, they face choices regarding which functions will be subjected to tightly-managed search, design and execution processes, versus which functions will be guided by improvisation. These choices may have important consequences for firm performance and strategic competencies (Nicholls-Nixon et al., 2000). Our finding that Improv competencies can impede the development of DPE competencies, while not surprising, suggests a potentially complex ecology of interactions between improvisational competencies and long-term firm survival and growth.

This study also contributes to ongoing efforts to clarify the improvisation construct (Weick, 1993b; Crossan and Sorrenti, 1997; Moorman and Miner, 1998b; Miner et al., 2001a,b) and distinguish it from other concepts (Appendix A) that bear a family resemblance to improvisation. We noted that the giving of public accounts can mean that some local, tactical improvisations become "selected" as higher level strategies and shape further activity. By showing how improvisational tactics can turn into strategies, this study goes beyond prior internal evolutionary models of the firm that focus on the selection of specific routines (Miner, 1989, 1991) or that focus on selection among pre-existing strategies (Burgelman, 1994). In addition, our observations contribute to conceptualizing the relationship between improvisation and bricolage, suggesting that improvisational activities may frequently involve bricolage, but that bricolage also occurs when design precedes execution.

4.3. Implications for research on bricolage

Perhaps because bricolage has sometimes been treated in the management literature as merely an aspect of improvisation, the concept remains extremely underdeveloped. Our study suggests not only that bricolage may be important whether or not improvisation is present, but also permits us to describe several other potentially important dimensions of bricolage.

4.3.1. Network bricolage

We have drawn on our data to introduce the concept of "network bricolage," defined as "dependence on pre-existing contact networks as the means at hand." As traditionally defined (Levi-Strauss, 1966:17), bricolage provides analysts very little guidance as to what constitutes a resource or the means at hand. For example, Levi-Strauss variously declares "tools", skill "repertoires" and even pieces of myths as resources available to bricoleurs. As we reviewed our data, we observed a wide variety of resources that were in various circumstances treated by founders as the means at hand. Searching for a construct to bring order to these resources, we noticed that in most cases, the means at hand that provided access to sundry resources were identified as members of founders' contact networks. While prior work has shown that entrepreneurs make extensive use of network resources (Aldrich and Zimmer, 1986; Birley, 1985; Suchman, 1995), the network bricolage construct emphasizes patterns of behavior in which entrepreneurs depend on contacts as their primary means at hand, and provides a useful contrast with "networking" and other behaviors in which entrepreneurs seek resources from strangers.

Introducing the concept of network bricolage allowed us to generalize across the specific resources founders had at hand and to distinguish between network bricolage and resource-seeking during and after founding, as well as between DPE and Improv foundings. Perhaps more importantly, it suggests links between research on improvisation and bricolage to the literature on social networks. An example of such a link, in the context of entrepreneurs' "knowledge corridors" is developed in Section 4.4.

4.3.2. Bricolage versus resource-seeking

As described by Levi-Strauss, bricolage may be contrasted with behavior which seeks new resources in order to deal with new situations and challenges. Bricoleurs use their intimate familiarity with the tools and materials they have gathered because they might "come in handy" as a way to deal with whatever tasks and challenges might arise (Levi-Strauss, 1966, p. 19). Levi-Strauss contrasts the engineer, who might determine the proper tools for a task, and then gather them, with the bricoleur: "The 'bricoleur' is adept at performing a large number of diverse tasks; but unlike the engineer, he does not subordinate each of them to the availability of raw materials and tools conceived and procured for the purpose of the project. His universe of instruments is closed and the rules of his game are always to make do with 'whatever is at hand', that is to say with a set of tools and materials which is always finite . . . (1966:17)"

Levi-Strauss' rigorous conceptual dichotomy is useful as a platform for developing the bricolage construct. For example, a very strict distinction implies that sometimes bricoleurs will be forced to abandon opportunities or be unable to deal with problems because the resources at hand are simply inadequate. However, our findings led us to reject the strict implication that founders engage either in resource-seeking or in bricolage. Entrepreneurs may engage in bricolage at some times and in some domains, and reject bricolage at other times or for other activities. Indeed, even Levi-Strauss' empirical descriptions depict admixtures of bricolage and resource-seeking. In the current study, some founders engaged in network resource-seeking for founding opportunities, but relied heavily on network bricolage afterwards. Recent theory on young firms suggests that transitions from network bricolage to network resource-seeking behaviors may characterize start-up firms' successful transitions to accelerated growth (Hite and Hesterly, 2001). Our ongoing research begins to explore trade-offs and transitions involving both bricolage and improvisation across a variety of firm activities.

4.4. Implications for research on entrepreneurship

Our discussion of improvisation resonates with the literature on "knowledge-corridors" (Sarasvathy, 2001; Shane, 2000; Venkataraman, 1997)—the idiosyncratic aspects of people's lives and circumstances that shape their knowledge and insights about profit opportunities (Kirzner, 1985; Nelson, 1995; Nelson and Winter, 1982; Shane and Venkataraman, 2000). Observers have long noted patterning between entrepreneurs' prior work histories and the forms of the firms they build, the products they offer and the strategies they adopt (Aldrich and Wiedenmayer, 1993; Boeker, 1988; Venkataraman, 1997). Freeman (1982) noted that "Entrepreneurs rarely begin without extensive experience in similar kinds of organizational activity." Eisenhardt and Schoonhoven (1990) observed that in their sample of semiconductor start-ups, "Entrepreneurs appeared to begin ventures in markets they knew, rather than in markets that industry analysts saw as attractive" (p. 524). Consistent with this literature, most of the entrepreneurs we studied formed businesses that were in important ways offshoots of their prior work.

This previous literature exploring the effects of prior work histories on entrepreneurship has focused primarily on the *opportunity exploitation*; on how prior knowledge and experience shape the firms that entrepreneurs build to take advantage of the opportunities they have already recognized. More recent efforts have begun to explicate how entrepreneurs' idiosyncratic backgrounds influence *opportunity discovery*. Venkataraman (1997) drew on Austrian economics (Hayek, 1945) for the insight that "opportunity discovery is a function of the distribution of information in society" (Shane, 2000, p. 448). Shane (2000) tested a group of propositions based on the assumption that differences in people's prior knowledge influence the opportunities they discover. Focusing on a single manufacturing technology patented by MIT, he demonstrated that eight different people who evaluated the technology envisioned eight substantially different opportunities for its commercial use. Four very different firms were founded to exploit the technology.

Our data suggest that the current view of individual-level knowledge idiosyncrasies in entrepreneurship will benefit from use of a complementary but more socialized view (Granovetter, 1985) that attends to the social networks in which people who discover opportunities are embedded. Although Venkataraman included social relationships (1997:122) among the sources of idiosyncratic knowledge, his brief discussion of social networks focused, like most prior literature (Hite and Hesterly, 2001) not on opportunity identification, but on exploitation. He noted, "evidence is slowly accumulating that shows individuals employ a wide variety of social capital in the pursuit of a venture" (1997, p. 127) but did not explore how social capital might aid in opportunity discovery. Shane (2000) invoked individual-level prior knowledge as the determinant of differences in the opportunities different potential entrepreneurs envisioned for a single patented technology.

However, differences in entrepreneurial opportunity discovery are sometimes a matter of idiosyncratic differences in social networks and how they channel information (Burt, 1992) and opportunities. Earlier, we described a parallel between Granovetter's (1995) study of job finders and our sample of entrepreneurs. In both the studies, people discovered opportunities related to their current fields through conversations with network contacts and without engaging in search (Kirzner, 1997). Similarly, in Shane's eight cases, he describes each potential entrepreneur as made aware of the single MIT technology through social contact with a person involved with the development of the technology. The eight potential entrepreneurs engaged in no search for the new technology, and recognized only opportunities closely related to their prior work. Discovery of opportunity "involved recognition, rather than a search for information" (Shane, 2000, p. 457). In all three studies—the current study, Granovetter's, and Shane's—opportunities came to people who were not searching for them; the process of "discovery" was mainly a process of "recognition;" the knowledge required for such recognition was a result of prior work experiences; and discovery was primarily limited to opportunities closely related to prior work. We speculate that in each of these cases, idiosyncratic differences in social contact networks were strong complements to idiosyncratic differences in individual-level prior knowledge. Knowledge corridors are structured in large part by social networks.

A large literature describes the role of social networks in structuring the opportunities available to individuals (Burt, 1992; Hagan, 1998; Kadushin, 1995; Padgett and Ansell, 1993), with less focus on the role of networks in opportunity discovery (Nohria, 1992; Powell and Brantley, 1992). In particular, prior work on entrepreneurship and social networks has emphasized the ways that entrepreneurs make use of their networks to exploit opportunities they have already discovered (Aldrich and Zimmer, 1986; Birley, 1985; Dubini and Aldrich, 1991; Johannisson, 1998; Zhao and Aram, 1995). The emerging literature on knowledge corridors and opportunity recognition has emphasized differences in individual knowledge. Our study points to the value of investigating the role of social networks in structuring knowledge corridors and entrepreneurial opportunity discovery in order to understand "the nexus of opportunity and enterprising individual" (Venkataraman, 1997, p. 123). Individual differences matter for opportunity discovery, but these differences are to an important extent a function of differences in the networks within which the individuals are embedded.

5. Conclusion

Our inductive study suggests that not only may founding itself be improvisational in some cases, but improvisational processes and issues permeate entrepreneurial activity and have non-obvious implications for emergent firm strategies and competencies. Bricolage, while playing a key role in improvisation, also occurs outside of improvisational episodes, and represents a promising theoretical and practical concept for research on the entrepreneurial process. Theoretically and in practice, both improvisation and bricolage represent potentially rich additions to the vocabulary of entrepreneurial action.

Appendix A. Relationship between constructs

Relationships between constructs and contrast are shown in Tables 4 and 5.

Table 4
Improvisation and related constructs[a]

Construct	Contrasts
Improvisation: The convergence of design and execution (Moorman and Miner, 1998b; Miner et al., 2001a).	–
Adaptation: Adjustment of a system to external conditions (Campbell, 1969; Stein, 1989).	Adaptation can occur without the convergence of design and execution; adaptation may involve planning, or invoking routines.
Bricolage: Making due with the means or resources at hand (Levi-Strauss, 1966).	Bricolage may often occur during improvisation (Weick, 1998). However, it may also occur in the implementation of pre-existing plans.
Creativity: Novelty or deviation from existing practices (Amabile, 1983). Work is creative if it is original, purposeful and felicitous (Gruber, 1989).	Improvisation involves some degree of creation (composition) but of a special sort. Many forms of creativity do not involve combining creation with performance (e.g. an author may write a play or a composer may write a symphony that is not performed).
Innovation: Deviation from existing practices or knowledge (Vand de Ven and Polley, 1992; Zaltman et al., 1973).	Improvisation implies some degree of innovation. However, innovation need not imply improvisation: much innovation is planned.
Intuition: Choices are made without formal analysis (Crossan and Sorrenti, 1997).	Some improvisation may involve intuition. However, the design which converges with execution may include formal analysis. In addition, what appears to be intuitive may be the novel deployment of pre-existing routines or procedural memory, similar to other forms of creation (Simon, 1979; Gruber, 1989). Moreover, organizational improvisation may involve several people, where as intuition is primarily an individual-level phenomenon.

[a] This appendix adapts and expands Moorman and Miner (1998b) and Miner et al. (2001a,b)

Table 5
Bricolage and related constructs

Construct	Contrasts
Bricolage: Making due with the means or resources at hand (Levi-Strauss, 1966).	NA
Causation: "Causation processes take a particular effect as given and focus on selecting between means to create that effect" (Sarasvathy, 2001, p. 245).	Trying to create a predetermined effect may be achieved through planning required resources and acquiring them for this purpose (resource seeking) or through bricolage (trying to reach the outcome using materials at hand).
Effectuation: "Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001, p. 245).	Both bricolage and effectuation involve starting with a set of means. However, bricoleurs may use materials at hand both to see "What can I accomplish with my current resources?" (effectuation) and to find out "How can I meet my pre-existing goal through what is at hand?" (causation).

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